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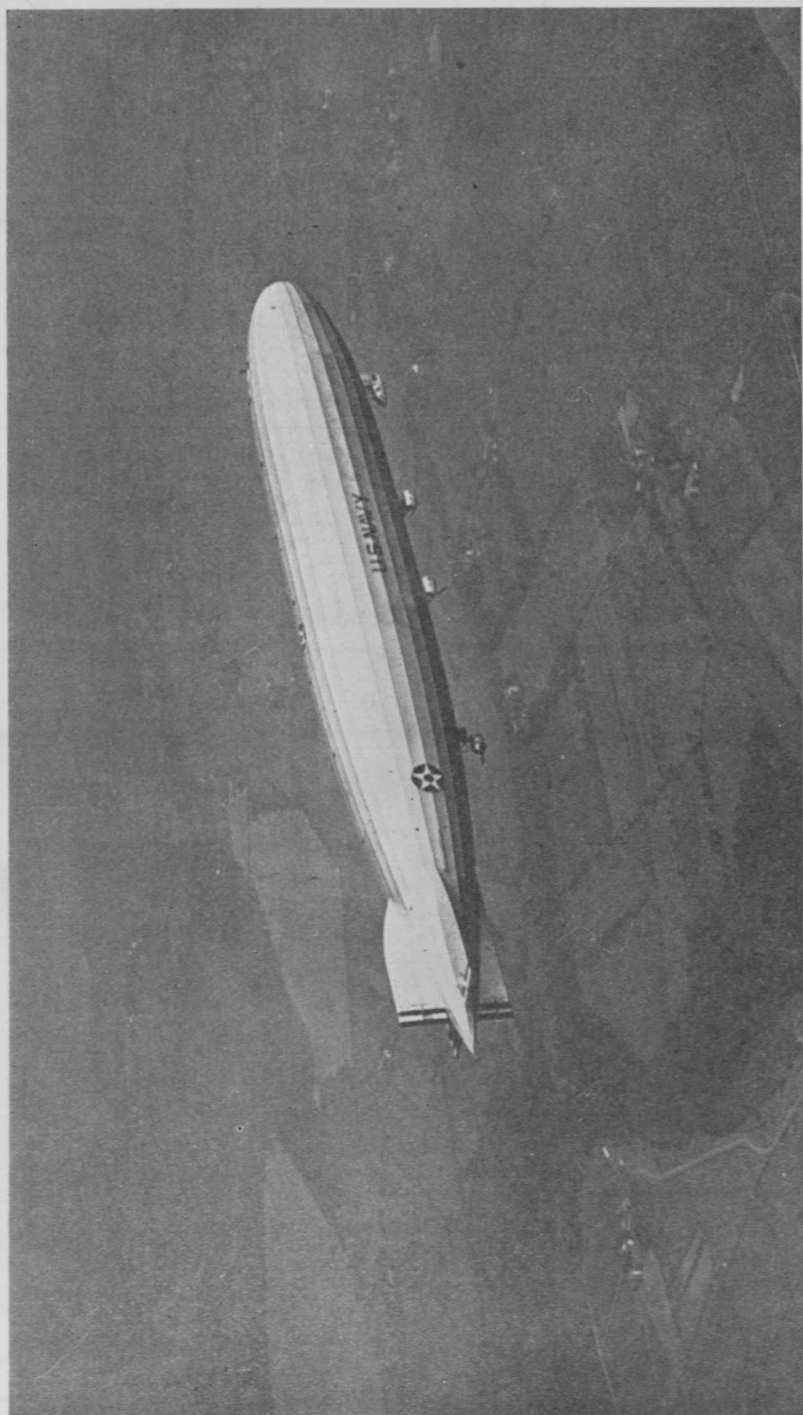
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THE SHENANDOAH

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Progress in Gunnery

WAR DEPARTMENT

OFFICE OF THE CHIEF OF COAST ARTILLERY
Washington

July 10, 1928

To the Editor, COAST ARTILLERY JOURNAL:

Being about to leave the Coast Artillery Corps I wish to make a confession to its personnel. To some of you it will be no news; to others it may "explain the onexplainable, onscREW the inscrutable" as the old negro parson put it in the familiar story.

I returned in 1924 to the Coast Artillery after nine years of detached service and war duty. I shall never forget the shock experienced at the first seacoast gun practice witnessed. My last two commands had been the "One-two-two Company" and the 35th, both live units. The latter fired three shots on one occasion, from a disappearing 12-inch gun at the rate of 18 seconds a shot, starting with breech block closed and no ammunition allowed on the gun platform. When I saw a 6-inch disappearing gun, in 1924, remain in battery about 15 seconds waiting for the bell, then, because the gun pointer was not on the target when the bell struck, waiting 30 seconds for the next bell, I knew that "something had happened" to the Coast Artillery.

Of course I realized that certain regulations, published since 1913, prevented the rapid fire of former years. For example the command "Trip" could not be given as soon as the rammer was withdrawn after pushing home the powder charge, for we must not insert the primer until the breech was closed and locked. There were limitations also on loading operations. But all idea of firing at the greatest rate possible seemed lost.

I remembered how, in the old days, we used to watch the men at drill and if one man stood idle for a second or two while another was busy we rearranged the work if possible. I remembered how we fired as soon as the counter-recoil buffer *began* to act, thus saving the two

or three seconds "creeping" into battery. Of course the range setter, who followed the target continuously in range in those days, had to carry in mind also the correction to be applied as the gun crept in; as I recollect it, this was plus 120 yards for two inches "from battery" to plus 20 yards for one-half inch. But he *could* be trained for this and *was*. I remember at one practice how General Murray thought the breech had blown open until asked to watch the men on the next shot and see how the breech detail jumped for the breech during recoil and had it nearly open before the piece had settled. His exclamation of surprise was quite expressive.

And I remembered how the gun pointers were trained at drill to throw the gun onto the target during the tripping interval. How they would let the target go during the estimated loading interval then throw the lever of the electric control over, count five seconds (time enough if the gun was fired two inches from battery) then with the cross wire on the target bring the lever back to center and ram down the handle of the exploder—we installed our own firing circuits then. I remembered how at a practice of the 35th Company, Gun Pointer Richardson of No. 2 gun, when the blast from No. 1 swept over in front of him, threw his lever in the regular way and fired through the murk. After the practice I asked him—

"How did you come to do that, Corporal? You couldn't see twenty feet."

"I know that, Captain," was the reply. "But I was dead sure I was on the target."

The shot was a hit—eight yards left.

I do not advocate such methods at target practice—they are as dangerous to the tug in peace as they would be to the enemy in war. I give the story to show the character of gun pointers we trained. Rarely was a hit lost in deflection though our target was only 20 yards broad at one period. We had a custom when a target was actually destroyed by a hit of rescuing the red flag that had floated on it. We used to hang the flag in the day room with a framed inscription as follows—

"Flag from pyramidal target
Destroyed at practice of the _____ Co. C. A. (date)
by
Gun Pointer _____"

Ishler, of the 35th Company, had five to his credit when I left the Company in 1909. Johnson, of the 122d Company, destroyed three targets in the two practices of that Company at Fort Wright in 1913. I was a firm believer in those days that in a decisive engagement we

should have to come at times to "Gun Pointers' Action." I still think so and believe they should be trained to get their own deflection and spot their own shots at short ranges; this can be done at sub-caliber practice.

We trained the gun crews for continuous fire by making two sets of dummy projectiles and powder charges of wood, 11½ inches in diameter. The first two rounds were rammed well up in the bore, for the third round we used the regular dummy ammunition. The first sergeant stood by one gun with a stop watch, the quartermaster sergeant by the other. They took out the tripping interval for the first two rounds; the gun was tripped on the third. In the 35th Company we closed each drill with a contest, the two crews starting on bugle signal. They were so evenly matched that we had to stretch a string across the parapet (as is done in foot races) and the muzzle of the gun that struck the string first won the contest for that day.

It is true our practices were at short range—from 6000 to 9000 yards. In fact I think 8400 was the greatest range any of my batteries ever fired. And it is true that we had companies of 109 men and little to do except our own training, while the present small batteries are loaded with heavy requirements that frequently take precedence over their own battery work. But really, gun crews, given the proper spirit, do not need prolonged drills—the most efficient I have ever seen were drilled less than 20 minutes five days each week. The gun commanders and plotters were allowed to drill their men for 15 minutes, supervised respectively, by the battery officer and the range officer, then the battery was called to attention and put through the contest described above. It was after about eight months of this type of training that one detachment made the record of 18 seconds a shot. The Company stood No. 1 in the Corps on both practices that year.

The men we had in 1924 were no different as to type and intelligence from those of one or two decades earlier. The requirements of drill regulations had changed so as to make operations both at the gun and in the plotting room more difficult, but not so much so as to account for the entire change of attitude, spirit, and accomplishment. A little investigation soon convinced me that the real reason lay in the fact that the training was no longer such that the men visualized themselves as engaging an enemy in a decisive action—an action in which they must hit hard and fast to win. The training accentuated the problem of adjustment of fire—our practices simulated a deliberate reply to a long range bombardment; *nothing more*. This did not interest the men; it did not lend itself to the spirit of competition which might have aroused their interest. The firing was of interest only to the

officer conducting the practice, and I found none who did not understand the various methods prescribed for making the adjustment. In brief a unit was no more fitted for its work in war after the practice than it was before.

I came to the conclusion that we had retrograded in battery action and that we had progressed about as far in teaching adjustment as could be done. A few months later, when I received notice that I was to be detailed to the Chief's Office, I made up my mind that all the influence I could bring to bear should be used to restore the old spirit and interest, that firing should be conducted as it would be in a real fight. To accomplish this I felt that competitive firing and a classification system were necessary.

Now I come to the confession.

As soon as possible the matter was discussed with those on duty in the Chief's Office. While some were opposed to a rating system others welcomed the idea with enthusiasm, one stating that he felt certain he could have the award of the Knox Trophy resumed if we could arrive at some method of comparing our widely differing organizations. We listed the units firing and the ratings given by local commanders and found, as was to be expected, no uniformity of standard. It developed that in some districts units were wearing the E while units in other districts that had really held better practices were rated only S. The matter was then laid before the Chief who approved the scheme for a centralized classification, and authorized the organization of a gunnery office. Several months of hard work followed and we then presented our plan to the General Staff. With some modifications it was approved.

Naturally we realized that there were inconsistencies in our first scoring formulae—that only by trial could formulae, giving a truly just comparison of the work of personnel manning such varied materiel as 14-inch guns and, say, antiaircraft machine guns, be established. But we felt that we had ensured a greater attention to service of the battery and had properly accentuated the firing at longer ranges demanded by the Chief of Staff, without minimizing the importance of a proper adjustment of fire. The result was not satisfactory except for the antiaircraft. While range and accuracy increased somewhat, there was a marked falling off in the rate of fire. No gun above 6-inch caliber averaged one shot a minute and our rapid fire guns also were far below the standards of the Navy and our own past standards as to rate of fire. It seemed evident that there was a distinct resistance within the Corps to firing at the rate that would be demanded in case of a serious engagement.

It was decided that this resistance must be broken down. Accordingly for the following year scoring formulae were prepared so accentuating the speed element that no battery could hope to stand well that d'd not make its K factor. It was recognized fully that such action would result in an unscientific balancing of factors, but I told the gunnery officer to prepare formulae that would either make them speed up or suffer. And he did. He really went further than I intended but the whole office was so impressed with the need for strong action that the formulae suggested were adopted.

The results have justified the action. Without halting the improvement in accuracy and range a large percentage of the batteries increased the rate of fire. Reports indicate that lately prewar standards have been exceeded in some instances.

But there has naturally been a strong adverse reaction. Attention has been called to some "rotten" practices which must be classified high due purely to the fact that the battery commander "shot at the score instead of the target"; that he didn't care where the shots fell provided he could fire fast. This is not altogether praiseworthy and yet, if by so doing, the battery commander has proved to himself and to his men that the K factor can be beaten it is well worth the ammunition expended. For it is easy to apply the mechanical devices ensuring accuracy, it is easy to learn the principles of adjustment and apply them, but it is not easy to put spirit and interest into a lethargic group of men. The ratings this year are going to be peculiar but it is believed the last sleepy battery in the Corps will have been thoroughly awakened.

A month ago I sat on a bank back of the railway artillery during the battle practice at Fort Story. It was the happiest day I have passed since my return to duty with the Corps. I noted the confidence, the teamwork and the high spirit of the huskies who were handling the guns and ammunition. I noted the scheme they had devised to cut down the time of ammunition service and of fire. One thing like that pleases me more than twenty devices adopted from some foreign army or initiated by a supply corps. There is no doubt that regiment lives in an atmosphere of being *ready to fight hard*. I think the bulk of the Corps is now living in that same atmosphere.

I believe we have accomplished what was desired and can promise the Corps that the next scoring formulae issued will satisfy all who are willing to accept the principle that hits and rate of fire are of equal importance in a decisive action. That is, viewed from the effect upon the enemy, two hits per minute mean the same whether the two guns of a battery are fired once a minute and hit every time or are fired

twice a minute and hit half the time. Of course in replying to a deliberate bombardment we should consider erosion and expenditure of ammunition, but, as already stated, the Corps has had enough practice of this kind.

We have adopted four components---

A, the hitting component.

B, the accuracy component.

C, the time component.

D, the penalty component, this last being entirely subtractive.

Neither a hitting nor an accuracy component alone will satisfy the Corps. There are many who urge no hitting component, claiming that hits, especially at the long ranges required, are largely a matter of luck; these would place the entire weight in the accuracy component. There are many others who state that a center of impact will not sink a ship and would throw everything into the hitting component. Actually analysis shows that only rarely will a battery do well in one of these components without doing well also in the other.

Starting with an arbitrary multiplier for the B component we have weighted the others accordingly. Since the D component is based on errors and errors affect also the A and the B components, these errors normally penalize three times. We have therefore arranged the weighting of the C component so that $A+B-3D$ should equal C and have given C a multiplier to accomplish this. A very large number of practices have been carefully reviewed and the multipliers adopted are such that rate of fire and accuracy are balanced for the average accomplishments of the whole Corps.

Realizing that we shall have to meet the speed fiend and the accuracy fiend, we have provided so that neither of these can ride his hobby to the detriment of other considerations without suffering. There is no limit to the A and B components *provided the battery fires at the rate given as K*—if the battery fails to attain this rate both A and B are limited to the value of the multiplier; that is it cannot attain a score on these higher than normal expectancy. Also there is no limit to the C component *provided the battery obtains an adjustment*—failing in this, regardless of speed, the component is limited to what would be obtained if the K were barely made. So, to make an outstanding score, a battery must get its adjustment and also beat the K factor. It is understood that Major Jarman has undertaken to write a full explanation of the new formulae.

It has all been a great game and I am sorry to leave you. I am perfectly willing to accept full blame for everything that has been fretting many of you, and doubtless outraging the sensibilities of

some of you, during the past two years. It is true others have done most of the work and that the decision has been made by our wise old Chief whose finger has been on the pulse of the Corps every minute. But any blame due really is mine, for I started the thing and have missed no chance to put a wedge in every crack I saw and slug each wedge at every favorable opportunity.

So here's wishing you all good luck and a high morale. They go together and the former does not produce the latter any oftener than the latter produces the former.

C. E. KILBOURNE.

MAXIM LXXVII

Generals-in-chief must be guided by their own experience, or their genius. Tactics, evolutions, the duties and knowledge of an engineer or artillery officer, may be learned in treatises, but the science of strategy is only to be acquired by experience, and by studying the campaigns of all the great captains.

Gustavus Adolphus, Turenne, and Frederick, as well as Alexander, Hannibal, and Cæsar have all acted upon the same principles. These have been—to keep their forces united; to leave no weak part unguarded; to seize with rapidity on important points.

Such are the principles which lead to victory, and which, by inspiring terror at the reputation of your arms, will at once maintain fidelity and secure subjection.—Napoleon's Maxims of War.

Preparation of Antiaircraft Defense Plans

LOCATING GUN BATTERIES

A systematic method for determining the location of the gun batteries is as follows:

a. Provide three or more celluloid discs with a radius of 5000 yards, a scale graduated in yards, a scale graduated in seconds of flight at 100 miles per hour and a scale of shots at 88 shots per minute, all on the scale of the map in use.*

b. Plot the defended area on the map; it may often consist of several unconnected points such as a bridge and a railroad yard which may be enclosed to make a continuous irregular figure.

c. Around the defended area plot the danger zone, assuming a bombing altitude of 4000 yards, and a speed of 100 miles an hour or 48.89 yards a second. This zone will be 1335.5 yards wide or 0.77 inch on a scale of 1:62,500.

d. Plot the decisive zone around the danger zone, making its width 2933.3 yards, which is one minute of flight at 100 miles an hour; on the above scale this width is 1.69 inches.

e. Place the three discs representing the field of fire of the three batteries of a regiment so that there is no portion of the decisive zone not covered by the fire of at least one battery, or, as nearly as may be, with three batteries. The centers of the discs should be not over 5000 yards apart. These centers then indicate the ideal location of the batteries; their actual location, in this vicinity, will depend on availability of suitable battery positions.

f. If there be adequate reason to believe that hostile planes will approach or will not approach from one given direction rather than another, the defense may be shifted accordingly; the chief consideration in determining probable direction of approach would be the presence of adjacent antiaircraft batteries.

Should the field of fire of three batteries as shown by the discs fail to cover the decisive zone in its entirety, the defense is weak; if the decisive zone is so covered, a reasonable defense is provided.

Should the defended area be of vital importance such that more than a reasonable defense is called for, the defense should be extended outward. This ordinarily will be accomplished not by adding an outer ring of batteries but by completely replanning the defense in

*Obtainable from the COAST ARTILLERY JOURNAL.

such manner that a broader "decisive zone" will be covered. A systematic scheme of work for locating the batteries to provide this added strength is as follows:

a. Provide four, five, or six discs as before described, one for each battery which may be required or which may be available.

b. Around the decisive zone plot an additional zone 1466.7 yards in width (0.845 inch on the same scale); to cross this zone will require 30 seconds in addition to the minute of flight provided for by the normal decisive zone. Where the defended area is approximately circular and not more than about $1\frac{1}{2}$ miles in diameter, it will be found that with four batteries placed at the corners of a square 5000 yards on a side, there will be no portion of this 4400-yard decisive zone which is not covered by one battery; and that with this number of batteries one-half the width of the original decisive zone of 3000 yards will be covered with the fire of two batteries.

Should the importance of the objective be so great as to demand a still stronger defense, the maximum effect with five batteries (where shape and size are as before) will be obtained by placing them at the points of a pentagon 5000 yards on a side (2.88 inches to scale), the center of which is at the center of the defended area and the distance of the batteries from that point such that the fire of the batteries will completely cover a decisive zone of twice the normal width, requiring two minutes of flight. The points of the pentagon are approximately 4400 yards (2.30 inches to scale) from the center of the defended area.

After laying out the proposed gun defense, the dispositions should be checked. This may be done by determining by trial, using the appropriate scales: (*a*) the number of shots which would be fired, at the standard rate, at a target approaching the defended zone from each significant direction; (*b*) the number of seconds of flight of the target from the time it comes under fire until it reaches the danger line.

Figure 1 illustrates the preceding discussion, assuming a circular objective.

LOCATION OF SEARCHLIGHTS

Searchlights should be placed so as to be able to pick up the target long enough before it reaches normal gun range to enable the battery to burst a salvo at that range. An estimate of the time required for each of the operations involved is as follows:

Time to search for and pick up target _____	15 seconds
Time for the battery commander to designate target _____	4 seconds
Time for turning height finder and computer on target _____	5 seconds
Time for obtaining correct data _____	6 seconds

Dead time	1.5 seconds.
Time of flight at 5000 yards horizontal range and 4000 yards altitude	15.2 seconds
Total time required before target reaches gun range	46.7 seconds

In this time the target flies 2283.1 yards.

Searchlights then should be placed so as to pick up the target at 5000 yards plus 2283.1 yards from the battery, or 7283.1 yards.

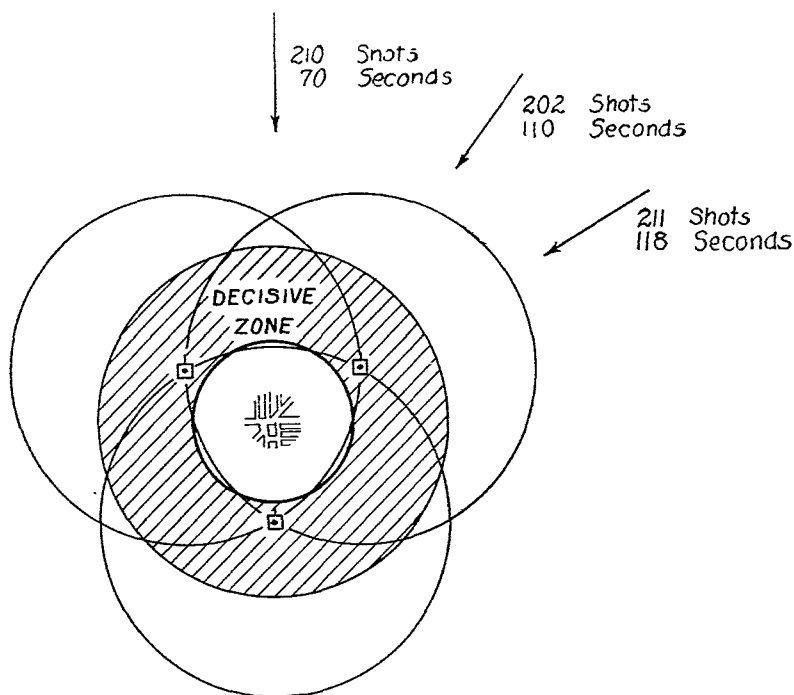


FIG. 1

A sufficiently close approximation may be obtained of the most desirable location of the lights, as follows:

a. From each battery as a center, draw arcs with a radius of 7283.1 yards (4.195 inches to scale). This is the "pick-up" line. Draw radii from the battery through the point where the 5000-yard circle from any battery intersects those from the adjacent batteries, until the radii intersect the outer arc or pick-up line. Divide the portion of this pick-up line intercepted between the radii drawn from a battery, into three equal parts; each part is the sector of one searchlight.

b. To locate the light, draw the chord of this portion of the pick-up line arc and erect the perpendicular bisector. The light should be located on this perpendicular.

c. From each battery as a center, draw an arc intersecting the three perpendiculars, using a radius of 2500 yards. This distance is taken arbitrarily as being probably the maximum by which the light should be separated from the battery. The points where the 2500-yard

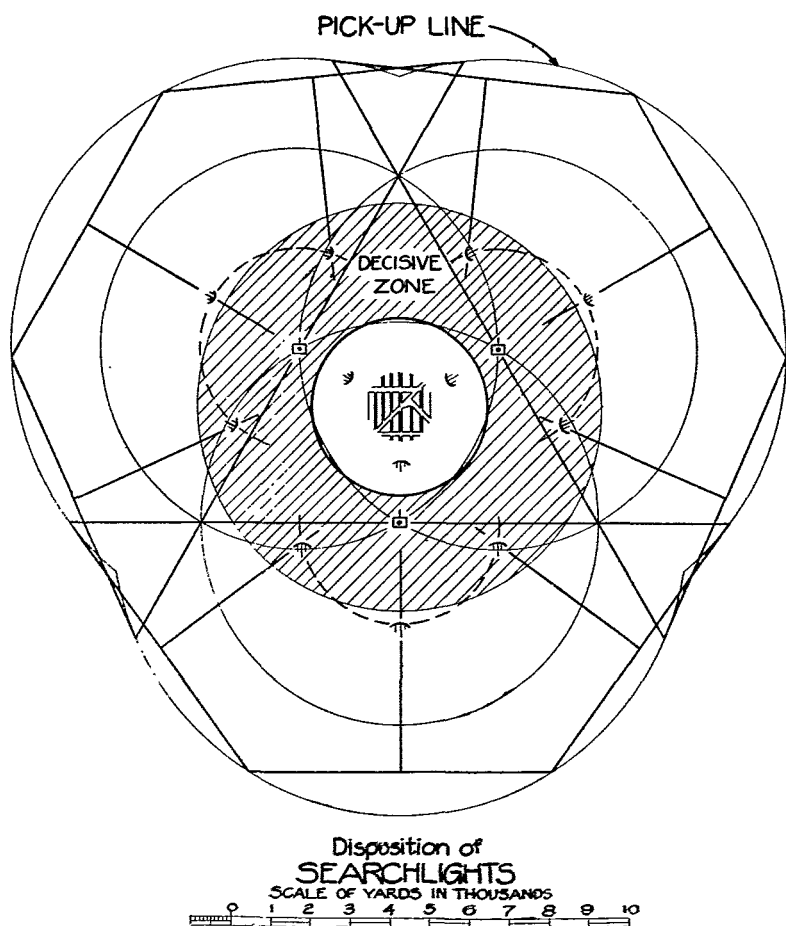


FIG. 2

arc intercepts the three perpendiculars are the ideal locations of the three forward lights of a platoon.

d. The fourth light should be located on a line connecting the battery with the center of the defended area and at a distance from the battery of about 1500 yards.

Figure 2 illustrates the preceding discussion.

LOCATION OF MACHINE GUNS

The horizontal range of machine guns, within which their fire is assumed to be effective at an altitude of 1000 yards, is 1500 yards. Their rate of fire for purposes of computation is taken as 1600 shots per platoon per minute. The present average accuracy throughout the above field of fire is approximately 1%.

This accuracy and rate of fire gives an expectancy of 16 hits per platoon per minute, or 1 hit each 3.75 seconds.

The speed of low-flying planes is assumed to be 125 miles per hour, or 61.111 yards per second. There is an expectancy of 1 hit per platoon each 229.17 yards of flight.

The four machine guns which form a part of the gun battery are intended for its immediate defense and should be posted as a platoon in such location near the battery as best to serve this purpose.

Platoons of the machine-gun batteries are located at a distance of about 1500 yards apart, in checkerboard formation over the area to be protected. This distance is modified in the following cases:

(1) Where the conspicuous appearance and importance of an activity such as an airdrome or tank park require that the platoons be drawn in closer.

(2) Where the great extent of the area to be protected requires that the distance be increased.

In disposing the machine guns, it is the conception that in whatever direction low-flying planes may travel, they will encounter machine-gun nests and must accept casualties as do infantry soldiers when attacking an organized position. The result to be desired is the destruction of the planes or that they shall be forced to fly at altitudes at which their weapons will be ineffective.

TABLE I

DATA FOR USE IN PLANNING ANTI-AIRCRAFT DISPOSITIONS

Standard rates of fire: 22 shots per gun per minute or 88 shots per 4-gun battery per minute; 1.467 shots per second (log 0.1663314). For World War type guns: 11 shots per gun per minute or 44 shots per 4-gun battery per minute; 0.733 shots per second; 33 shots per 3-gun battery per minute; 0.550 shots per second.

Assumed average accuracy of 3-inch guns; 9%.

Assumed probable maximum bombing altitude: 4000 yards.

Assumed speed of bombing planes: 100 m. p. h.

Standard map: Geological Survey 1:62500 (log 4.7958800).

Time of fall of bomb: 27.3 seconds.

Danger zone: 1335.5 yards wide; to scale: 0.769 inch.

100 m. p. h.: 48.889 yards per seconds (log 1.6892112).

For modern 4-gun battery—

Travel per shot: 33.33 yards (log 1.5227811).

Travel per salvo: 133.3; yards; to scale, 0.0768 inches.

Travel per 10 shots, to scale: 0.19196 inches.

Travel per 100 shots: 3333 yards; to scale: 1.9196 inches.

For World War type 4-gun battery (44 shots per minute)—

Travel per shot: 66.665 yards.

Travel per salvo: 266.7 yards; to scale: 0.1536 inches.

Travel per 10 shots, to scale: 0.38399 inches.

Travel per 100 shots: 6666.5 yards; to scale: 3.8399 inches.

For World War type 3-gun battery (33 shots per minute)—

Travel per shot: 88.889 yards.

Travel per 10 shots, to scale: 0.5120 inches.

Travel per 100 shots: 8888.9 yards; to scale: 5.120 inches.

Width of decisive zone 1 minute wide: 2933.3 yards (log 3.4673625).

Width of decisive zone, to scale: 1.6896 inches.

Width of decisive zone $1\frac{1}{2}$ minutes wide: 4400 yards (log 3.6020600).

Width of decisive zone, to scale: 2.3040 inches.

1 second of flight: 48.889 yards; to scale: 0.02816 inches (log 8.4496337).

10 seconds of flight: 488.89 yards; to scale: 0.2816 inches.

4 minutes of flight, to scale: 6.758 inches.

Radius of gun disc: 5000 yards; to scale: 2.88 inches.

Diameter of dead space at 4000 yards altitude with 85° elevation (2600 f. s.): 660 yards; to scale: 0.380 inches.

Diameter of dead space at 4000 yards altitude with 80° elevation: 1400 yards; to scale: 0.806 inches.

36

To reduce yards to inches to scale, multiply by fraction —;

62,500

log of this fraction=6.7604225.

TABLE II

TIME REQUIRED FOR CHANGING TARGETS

In studying the best location of gun batteries, the time required to engage a second target is a consideration. An estimate of the expected time, based on these fundamental data, follows:

Rate of fire, 38 shots per minute; 0.682 seconds per shot

Average accuracy throughout field of fire 9%, or roughly 1 hit in 11 shots

Time after first burst to first hit, 7.6 minus (0.682×4) , or 4.9 seconds

Duration of fire required to obtain 1 additional hit 7.6 seconds

Total time for 2 hits (to ensure 1 hit) 12.5 seconds

Assume that first salvo bursts as target is 5000 yards (horizontal range) from battery.

Time from first burst to second hit 12.5 seconds

Time to change target:

Time to recognize hit, say 3 seconds

Time to designate new target, say 4 seconds

Time for turning height finder and computer on new target, say	5 seconds
Time for obtaining correct data, say	6 seconds
Dead time	1.5 seconds
<hr/>	
Total time to change target	19.5 seconds
Total time from first burst until fire is opened on second target	32.0 seconds
Assume that the second target is abreast of the first:	
Horizontal range of first target at first burst	5000 yards
Distance second target has travelled at 100 m. p. h.	1515.6 yards
Horizontal range of second target when fire is opened	3484.4 yards
Time of flight for this range	11.3 seconds
Time of burst of first salvo on second target, after previous hit (19.5 plus 11.3 seconds)	30.8 seconds
Time of first hit on second target, after first burst	4.9 seconds
Add time for second hit (7.6 seconds) to ensure 1 hit, total	12.5 seconds
Total time from first burst on original target to second hit on second target	55.8 seconds
Horizontal range of both targets at first bursts	5000 yards
Distance second target has travelled	2728.0 yards
Horizontal range of second target when hit	2272.0 yards
Time remaining before target would be abreast of battery	46.5 seconds
<i>Summarizing the above:</i>	
Duration of fire on first target	12.5 seconds
Time for changing targets	19.5 seconds
Time of flight to second target	11.3 seconds
Duration of fire on second target	12.5 seconds
<hr/>	
Total time	55.8 seconds

MAXIM LII

Artillery is more essential to cavalry than to infantry, because cavalry has no fire for its defence, but depends upon the saber. It is to remedy this deficiency that recourse has been had to horse-artillery. Cavalry, therefore, should never be without cannon, whether when attacking, rallying, or in position.—Napoleon's Maxims of War.

Meteorology for Artillery

By CAPTAIN F. E. EDGECOMB, C. A. C.

METEOROLOGICAL information, when used in military installations and operations, is divided into two classes, namely, *statistical* and *current*. Statistical meteorological data are those facts which are compiled after a study of all records obtained by meteorological observations over a long period of time. As this discussion is of "Meteorology for artillery," we are more interested in current meteorological conditions than in statistical, although the latter may, in certain sections of the country, be valuable in connection with the basic corrections for artillery fire.

The data obtained from current meteorological conditions are of inestimable value to the artilleryman in order that he may be able to correct intelligently for their effect on:

- a. The range and deflection of projectiles.
- b. The speed and direction of sound.

Before discussing the methods used in obtaining these data a few of the elements that must be considered will be briefly explained.

Dr. Loomis, in his *Treatise on Meteorology*, states that the term *meteor* was, in early works on the subject, employed to denote those natural phenomena which occur within the limits of our atmosphere, as the wind, rain, thunder, rainbow, etc., and meteorology might therefore be defined as that branch of Natural Philosophy which treats of meteors. This branch of science treats of the construction and weight of the air; of its temperature and moisture; of the movements of the atmosphere; of the precipitation of vapor in the form of dew, rain, fog, clouds, etc.; and of many electrical and optical phenomena.

The modern military definition of meteorology is "the science of the earth's atmosphere." It treats of the condition of the atmosphere, its changes of condition, and the causes of these changes. The meteorological elements, or, as they are more commonly called, the weather conditions, which affect the earth at any particular time or place are:

- a. Temperature
- b. Pressure
- c. Wind
- d. Humidity
- e. Clouds
- f. Precipitation

The *atmosphere* is the mass of gasses that surrounds the earth. While it is believed that the air extends to more than two hundred miles above the earth's surface we are only interested, in so far as artillery fire is concerned, in those conditions to a height of approximately five and one-half miles.

The variations of the *temperature of the air* are caused principally by the sun. The air is heated in three ways: (1) by direct rays of the sun; (2) by contact with the warmer earth; and (3) by the radiation and reflection of heat from the earth.

Pressure, which is the combined weight of all the atmosphere, is the most important of the meteorological elements, since its changes affect wind, temperature, humidity, clouds, and rain. The winds are very closely related to differences of pressure.

► *Wind* is air in approximate horizontal motion. The three principal causes which produce it are:

- a. Unequal atmospheric pressure.
- b. Unequal specific gravity of the air.
- c. The rotation of the earth.

The direction of the surface wind is designated by the point of compass from which it is blowing and its velocity is recorded by various types of anemometers. The approved method of determining the direction and velocity of the wind aloft is by pilot balloon observations. The method of observation and an application of the data obtained will be discussed in detail later.

Firing tables, as now issued by the Ordnance Department, are computed on the basis that certain conditions of the atmosphere are standard. These assumptions are: (1) that there is no wind; (2) that air density at the battery is 59° F. and 29.53 inches of mercury; (3) that air saturation is 78%; (4) that the temperature of the air at the battery is 59° F.; and (5) that there is a standard atmosphere structure aloft. As these conditions will never exist it is evident that, for accurate initial corrections for the computation of firing data, some system must be used whereby the artilleryman can be informed of all variations from those assumed in computing the tables.

Data pertaining to the temperature, pressure, humidity, and movements of the air, to the maximum ordinate reached by a projectile, are necessary in order to correct for the *effects* of these elements. As a projectile, except in antiaircraft firing, spends one-half of its time in the upper one-fourth of the height of its trajectory the importance of accurate data concerning the upper layers of the air is evident.

When a target is at approximately the same level as the gun the effect of the variation from standard, in any layer of air, is propor-

tional to the time the projectile spends in that layer, provided the projectile passes twice through the layer. In the case of antiaircraft firing, when the target is reached before the projectile attains the maximum ordinate, the effect in any layer is proportional to the time the projectile spends in the layer, and to the time of its travel from the layer to the target.

It can be readily seen that the operations incident to an accurate and rapid tabulation of all the current meteorological data which would affect the conditions enumerated above are somewhat complicated. Various methods have from time to time been employed to obtain the desired results. The Meteorological Section of the Signal Corps has, as is well known to all artillerymen, established means for recording all essential data and has developed a graphic method whereby all reductions are accurately made and the message coded for transmission in a very short time after the last observation of a series has been made.

The methods employed by the Meteorological Section will be briefly described and references given to texts in which a detailed discussion of each operation may be found.

As stated above, firing tables are computed on the assumption that atmospheric conditions are standard. It is also assumed that the temperature, pressure, and density decrease at definite rates with altitude.

Ballistic Density. The ballistic density, as furnished, is a single computed air density used to express the density of the air for artillery purposes between the level of the battery and a specified maximum altitude. A separate ballistic density is furnished for each maximum ordinate. This, for all artillery purposes, is expressed as a percentage of standard.

As it would be impracticable to make upper air observations and compute ballistic densities therefrom in time for the data to be of use to artillery units, a method is used whereby densities are closely approximated from ground observations. Based on the average of the results of a large number of observations made in the United States, under various atmospheric conditions, tables have been prepared for use with the data obtained from surface observations. (See Table IV, page 332, Meteorological Observer, T. M. No. 31, Signal Corps.)

The correct air density at the surface can be obtained by using the surface temperature and the barometric pressure as arguments. (See Table III, T. M. No. 31.)

If the relative humidity is other than standard (78%) the corrections to be applied to the results from Table III, may be found in Table III-A, T. M. No. 31.

Actual air density decreases with altitude, and also decreases on the average more rapidly if the surface density is above normal. It also decreases more rapidly near sea level than at higher altitudes. These factors are all considered in the construction of Table IV.

The equipment used and the operations incident to the proper recording of the data referred to above are described in detail in the Signal Corps manual on this subject.

Wind. As the modern firing tables are computed on the basis of *no wind* it is evident that the wind correction may become one of the most important to be applied to the range and the direction data. This correction must be based on the assumption of a *uniform* wind at all altitudes, a condition which seldom if ever exists.

To enable the artilleryman intelligently and accurately to make the necessary corrections for wind effects, a system was necessary for calculating the direction and velocity of a *fictitious* uniform wind which

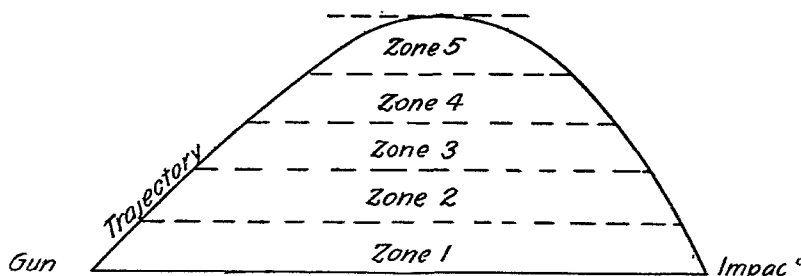


FIG. 1

would have the same effects on the range and direction as would be caused by the combined effects of all the actual winds encountered during the flight of the projectile. This fictitious wind, which is used by the artillery as if it were the actual wind, is called the *ballistic wind*. In the British Service it is called the "equivalent uniform wind," a term which is both apt and explanatory.

The Meteorological Section measures the average direction and velocity of the actual wind for successive zones as follows: surface data first, then for 600 feet, 1500 feet, 3000 feet, and each 1500 foot level there above to an altitude required for the problem at hand.

From the data obtained, the proper weight to be given the actual wind of each zone, in making up the ballistic wind, is found by determining what proportional part each plays in making up the total. A study of Figure 1 will show briefly the principle used.

Assume that a projectile is fired so that its path is affected by a wind which changes in velocity and direction as it rises. In zone 5, which

includes the maximum ordinate where the velocity is the least, the wind acts for a longer time on the projectile than it does in the lower zone, where the velocity is the greatest.

Since we know that the air density is less in the upper zone than near the surface of the earth, the wind therefore has less pushing effect on the projectile when it is near its maximum ordinate.

Regardless of the net results of all the factors to be considered it is evident that a wind in Zone 1 will not necessarily have the same effect as a wind of equal magnitude in Zone 5. Weighting factors for determining ballistic winds for different types of guns fired under varied conditions have been computed by the Ordnance Department.

The method of making an air sounding, to determine the direction and velocity of the wind at different altitudes, is described in detail in T. M. No. 31, pages 231 to 234 inclusive, and the charting of balloon observations and the method for reducing the wind data, to obtain the ballistic wind for use in artillery firing, is outlined on pages 247 to 253 inclusive, of the same manual. The wind weighting factors used for the *single message*, as now furnished to the artillery, are found in Table I, pages 314 to 320, of the same text.

Antiaircraft Meteorological Message. Theoretically, each combination of gun, powder charge, projectile, and angle of elevation has its own separate weighting factor curve for wind density and temperature. Ballistic winds, which require the use of "weighting factor curves," have been used in artillery since 1917 and a *single average weighting factor curve* was adopted for all artillery except antiaircraft guns. Because antiaircraft fire involves only part of the whole trajectory it was thought that a different curve should be used for this class of firing.

The French used an average set of curves for all antiaircraft firing based on the 75-mm. gun, and until about 1924 these curves were used generally by our antiaircraft artillery. In 1924 the Coast Artillery Board made certain studies with reference to the desirability of a single meteorological message for terrestrial artillery and a separate message for antiaircraft units. During this test plots of various exact weighting factor curves for antiaircraft guns, of the adopted average curve for other guns, and the curves used by the French were made. A study of the exact wind correction curves for the maximum of the 30, 50, and 70-degree trajectories showed "that the area covered by them was about equally distributed above and below the straight line through the origin, making an angle of 45 degrees with the axis of the coordinates."

The following table shows the antiaircraft wind ballistic weighting factors developed by the Ballistic Section, Aberdeen Proving Ground.

No.	Max. Ord. Feet	Zones									
		0 1500	1500 3000	3000 4500	4500 6000	6000 9000	9000 12,000	12,000 15,000	15,000 18,000	18,000 24,000	
1	600	Use wind during first minute									
2	1500	Use wind during second minute									
3	3000	.62	.38								
4	4500	.41	.39	.20							
5	6000	.31	.31	.27	.11						
6	9000	.20	.22	.20	.19	.19					
7	12,000	.15	.16	.15	.16	.27	.11				
8	15,000	.12	.13	.12	.13	.24	.18	.08			
9	18,000	.10	.11	.10	.10	.21	.20	.12	.06		
0	24,000	.07	.08	.08	.08	.16	.15	.14	.13	.11	

These weighting factors have been used with good results during antiaircraft firings at Aberdeen. The true wind has also been used to a great extent in the antiaircraft service.

Under the new "three message" system, as now proposed, the "C" curve data will furnish the best weighting factors for computing the correct ballistic wind for antiaircraft firing.

Three-Message System. In 1919 the Ordnance Department proposed a method in which three mean weighting factor curves should be used in computing data for the meteorological messages for artillery. This method permits the use of more nearly the true ballistic values than are now obtained with the single curve.

The single message system used is based on a *single* weighting factor curve which is the mean of the *true* weighting factor curves for various calibers, muzzle velocities, and firing angles. It is evident that by using *three* weighting factor curves instead of *one*, a nearer approximation of the true conditions can be obtained. The ballistic Section at Aberdeen Proving Ground has computed the data and plotted the curves necessary for a system using three curves lettered "A," "B," and "C."

In May, 1927, the Coast Artillery Board, using the data obtained in a comparative wind test made at Fort Eustis in January, 1925, when especially high soundings were taken, made a study of the corrections that would be possible by using the "A," "B," and "C" weighting curves as computed at Aberdeen. By using the proper weighting curve in connection with a study of 12-inch mortar firing data it was found "that the three-message system normally permits an accuracy of ballistic wind corrections well within *one* probable error." A study of 16-inch rifle data and other types showed "that wide variations in

wind effects would obtain and that accurate results can be expected only when the correct weighting factor curve is used."

As a result of this test the Board found that "accurate wind effects on projectiles of various type guns commensurate with accurate position finding and other applied corrections, can only be obtained when a greater number of wind weighting factor curves are used than is now the practice." From the results obtained it appears that three weighting factor curves should be sufficient.

If the "three-message" system is adopted as standard the separate message for antiaircraft can be replaced by the "C" message, which can also be used for terrestrial firing when appropriate.

The meteorological message now in use consists of groups of symbols arranged in codified form. The type of the message now used is familiar to all artillerymen and detailed instructions for decoding it are printed in all firing tables and in most artillery text books.

The form of the proposed three message system would be as follows:

MSLMSL

0620799

1620898A

1600797B

1590696C

2610797A

2590696B

2570595C

etc.

The three messages are to be computed for each altitude in the same manner as the single message is now computed. No change in the method of plotting is necessary.

It will be noted that the above message is for the first and second altitude levels only but that at each level there are three separate messages. The observations would be taken to the maximum ordinates of all artillery firings that might take place in the sector covered by the station.

The commanding officer of an artillery unit would select the one or possibly two appropriate for his firing, while the antiaircraft units would use the "C" message. Firing tables or specially prepared data sheets would give the correct message to be used, depending on the type of gun, weight of projectile, muzzle velocity, and elevation.

The factors for the three-message system are now being used by the Meteorological Sections at Fort Monroe and Fort Eustis where tests for one year, with the "three-message" system, are being conducted.

The three-message system, with a message completely computed for each altitude, will only be required under war-time conditions when a meteorological station could, from one complete sounding, furnish accurate meteorological data for artillery units of various types operating in a sector.

Any peace-time objection to the proposed change, on the ground that the new system will require larger meteorological details, can be overcome when one considers that under the usual target practice conditions the particular type of gun, projectile, and approximate elevation would be known in advance and only the proper message would need to be computed.

The system, as now being tested, provides for three weighting factor curves for *wind* only. However three curves for density weighting factors have also been computed. As explained above, there is no practical method for obtaining upper air observations rapidly enough to be of value to artillery units and therefore the system now used for reporting density will, for the present at least, be continued.

As we all realize, one of the most vital problems in the art and practice of gunnery is to discover a practicable method of reducing dispersion. In an article on "Methods of Fire Adjustment" by Brigadier General R. E. Callan, under a discussion of deviations we find the following statement: "This constant or systematic error was one most likely, due to wrong firing data, and the chances are that the error was the thing hardest to determine before firing, that is *the ballistic correction for the retardation of the medium fired through.*" Also, "that the law of ballistic deviations, especially in high angle fire, due to retardation caused by the air, is not clear."

Marked progress has been made in the methods used in computing firing tables and in the careful preparation of initial firing data. The "three-message" system of computing ballistic wind has already demonstrated that corrections for this variable can be made to within one probable error.

When we consider that an increase of one per cent in air density can cause a decrease of one per cent in the effective value of the ballistic coefficient (that is, the ability of the projectile to penetrate the air), we realize how important this one factor may become.

If, as we now find that by a more accurate method of measuring the ballistic wind, we are able to compute our initial corrections, due to it, to within one probable error, is it too much to expect that, when an accurate method of measuring ballistic density becomes of practical value to the artillery, we will have made another important step towards solving the gunnery problem?

CLASSIFICATION OF GUNS FOR RANGE BALLISTIC WIND USING THE THREE MESSAGE SYSTEM. TABLE GIVES MAXIMUM ELEVATION IN DEGREES FOR WHICH EACH MESSAGE IS USED

<i>Gun</i>	<i>Muzzle Velocity Feet Per Second</i>	<i>"A" Message Elevation Degrees</i>	<i>"B" Message Elevation Degrees</i>	<i>"C" Message Elevation Degrees</i>
75-mm. Model 1897, (Shell)	1805	0-25	25-45	-----
	1778	0-25	25-45	-----
75-mm. Model 1916	1900	0-40	-----	-----
8-inch Guns	3000	0-45	-----	-----
	2600	0-45	-----	-----
	1950	0-35	35-45	-----
155-mm. G. P. F. Shrapnel and Shell	2410	0-45	-----	-----
	1955	0-35	35-40	40-45
8-inch Guns	2600	0-40	-----	-----
	1950	0-35	35-40	-----
10-inch Guns	1800	0-40	-----	-----
	2400	0-40	-----	-----
12-inch Guns	2325	0-40	-----	-----
12-inch Mortars, 700-lb. projectile	635	-----	45-65	-----
	750	-----	45-65	-----
	865	-----	45-65	-----
	980	-----	45-65	-----
	1100	-----	45-55	55-65
	1230	-----	-----	45-65
	1350	-----	-----	45-65
	1500	-----	-----	45-65
	1800	-----	-----	45-65
824-lb. projectile	1300	-----	-----	45-65
1046-lb. projectile	550	-----	45-65	-----
	580	-----	45-65	-----
	600	-----	45-65	-----
	660	-----	45-65	-----
	685	-----	45-65	-----
	725	-----	45-65	-----
	790	-----	45-65	-----
	810	-----	45-65	-----
	900	-----	45-55	55-65
	915	-----	45-55	55-65
	1000	-----	-----	45-65
	1050	-----	-----	45-65
	1200	-----	-----	45-65
<i>Gun</i>	<i>Muzzle Velocity Feet Per Second</i>	<i>"A" Message Elevation Degrees</i>	<i>"B" Message Elevation Degrees</i>	<i>"C" Message Elevation Degrees</i>
14-inch Gun, Model 1910, for 1560-lb. projectile	2370	0-40	-----	-----
14-inch Gun, Model 1920, for 1400-lb. projectile	2700	0-40	-----	-----
14-inch Naval Gun for 1200- lb. projectile	3000	-----	0-40	-----
16-inch Gun, Model 1919, for 2100-lb. projectile	2210	0-50	50-65	-----
	2470	0-50	50-65	-----
	2750	0-25	25-50	55-65
16-inch Howitzer, Model 1920, for 2100-lb. projectile	1350	0-15	15-40	40-65
	1550	0-25	25-55	55-65
	1750	0-25	25-60	60-65
	1950	0-25	25-60	60-65

The Vicksburg Campaign

By MAJORS VAN VOLKENBURGH, PERKINS, STUART, AND HOGAN

THE object of contention in this campaign was the Mississippi River, the importance of which was felt from the first by both the Federal and Confederate authorities. This importance was not only strategic. It divided the Southern States into two parts. If the Federals could get control of this river they would cut the Confederacy into two parts, and stop the passage of supplies and men to the Confederate Armies in the east from Arkansas, Louisiana, and Texas. This was a purely military consideration, but there was also a political and commercial one. It was impossible that the already powerful and fast growing northwestern states should see without grave dissatisfaction the outlet of their great highway pass into the hands of the Confederacy, cutting off trade between them and the outside world.

The Mississippi River being the bone of contention, it is altogether proper that a brief description of it in general, and of that part and the tributaries in and around Vicksburg, should precede the study of the campaign.

From Cairo, Illinois, the seat of the Naval Arsenal and depot of the Federal flotilla operating in the Mississippi, to the mouth of the river is a distance of ten hundred and ninety-seven miles by the stream. So devious, however, is the course of the river that the two points are only four hundred and eighty miles apart in a due north and south line. Throughout this long distance the character of the river bed is practically unchanged. The stream flows through an alluvial region, beginning a few miles above Cairo, which is naturally subject to overflow during floods occurring in the late winter and early spring. It will be seen that these rises had their bearing upon the operations of both sides.

At a few points along the banks high land is encountered. On the western bank there is only one point, at Helena, Arkansas, the remaining part being swamp lands reaching many miles southward. On the eastern bank such high points are more numerous. The one with which we are most concerned is at Vicksburg and the country contiguous thereto. Here a series of bluffs are met which at short intervals extend two hundred and fifty miles to Baton Rouge. The river, after pursuing its irregular course turns to the northeast five miles before reaching the Vicksburg bluffs. When it comes on them, it sweeps around abruptly,

continuing its course southwest, parallel to the first reach; leaving between the two a narrow tongue of low land, from three-quarters to one mile wide. The bluffs at their greatest elevation, just below the point where the river first touches them, are two hundred and sixty feet high; not perpendicular, but sloping down close to the water, their nearness to which continues, with diminishing elevation for two miles, where the town of Vicksburg is reached. They then gradually recede, their height at the same time decreasing by degrees to one hundred and fifty feet. The position was by nature the strongest on the river. The height of the banks, with the narrowness and peculiar winding of the stream, placed the batteries on the hillsides above the reach of guns on shipboard.

As stated before, Vicksburg stood upon a bluff 260 feet above the river. The country round about was cut up into a jumble of narrow ridges with deep ravines between them. A more or less continuous ridge curved along the heads of the ravines from Fort Hill, overlooking the river a mile above the town, to Stout's Bayou, three miles below the town. Outside the outer curve of the ridge the ground was very broken and difficult; along its crest, almost without a break, the Confederates had constructed strong fortifications enclosing the town on the land side.

North of the Yazoo River, marshes were everywhere, the ground heavily timbered, cut up with bayous and much overflowed a good part of the time. South of Vicksburg, except in the large bends between New Carthage and Grand Gulf, the swamps disappeared.

The region back towards Jackson was a rolling country of big plantations, containing much woodland. It is intersected by two unfordable streams the Big Black River and Bayou Pierre and by many of their branches and branches of the Pearl River, which, flowing south by Jackson, bounds the region on the east. The roads were all bad and the towns, except Vicksburg and Jackson, were villages. Two railways crossed at Jackson and being the capitol of the state and the base of supplies for the Confederate troops in the state, it was a place of great strategic importance.

By the end of June, 1862, the Union troops and fleet had gained control of the entire Mississippi River except the defenses at and around Vicksburg. The Federal fleet, under Farragut, had been able to pass the batteries, but was unable to take Vicksburg without the assistance of a large force on land¹, which could not be spared at that time². In August, General Breckenridge garrisoned Port Hudson³,

¹21 RR 514.
²21 RR 517.

³21 RR 795.

two hundred miles below Vicksburg, and this was held by the Confederates until after the fall of Vicksburg.

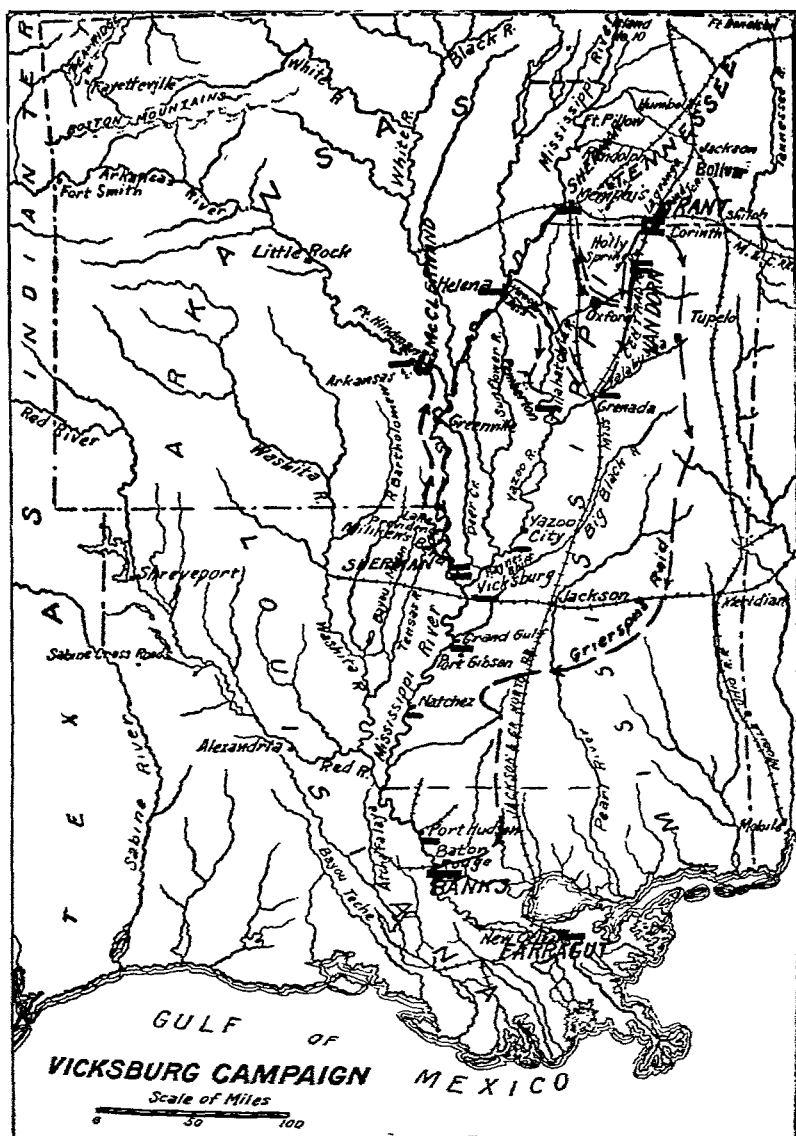


FIG. 1

Such was the situation on the Mississippi when General Grant took command of the Federal forces. General Halleck had just departed for Washington to assume the office of Commander-in-Chief⁴,

⁴25 RR 90.

and Buell and Bragg had started their race for Kentucky,⁵ taking with them all troops that could be spared from both sides. General Grant, with only 42,000 men, was left to guard the railroad from Memphis to Decatur, and to hold himself in readiness to reinforce Buell in Kentucky.⁶ Thus forced to assume the defensive, he occupied Corinth on the east, Jackson and Bolivar in the center, and Memphis on the left, with a reserve at Columbus.

Opposed to Grant were two independent commands, each of about 16,000 men; one under Van Dorn which was "scattered from Holly Springs to Vicksburg";⁷ the other, under Sterling Price, at Tupelo,⁸ guarding the Mobile and Ohio Railroad south of Corinth.

During the next two months the Confederates executed several unsuccessful maneuvers against the Union forces. Fearing that Rosecrans, who formed the left of Grant's line, was about to reinforce Buell in Kentucky, Price occupied Tuka on September 13 in the hope of cutting him off. Grant, however, reinforced Rosecrans by Ord's division and attacked Price before Van Dorn could join him. Price, however, slipped out to the south and joined Van Dorn at Ripley. Here Van Dorn took command of the combined forces and advanced against Rosecrans at Corinth on the morning of October 3. The Confederates were defeated the next day, and forced to retreat to Holly Springs.

On October 16, Grant was placed in command of the Department of the Tennessee⁹ with about 56,700 men present for duty.¹⁰ Being now in a position to assume the offensive, he immediately made plans to strike at Vicksburg.¹¹ On the Confederate side Pemberton, lately made a Lieutenant General, was placed in command of the Department of Mississippi and Eastern Louisiana, over Van Dorn and Price.¹² Their armies, estimated at 25,700, were holding the Tallahatchie, with advanced posts at Holly Springs and Grand Junction.

Grant's plan was to advance south down the Mississippi Central Railroad, and to cause the evacuation of Vicksburg.¹³ Sherman, with the force from Memphis, was to join Grant on the Tallahatchie while Curtis, at Helena, was to send troops across the Mississippi River and threaten the Confederate rear at Grenada. The Confederates continued to fall back before Grant's advance, so that by the thirteenth of November Grant's cavalry had entered Holly Springs,¹⁴ and by the third of December he was established at Oxford. The force from Helena, under Hovey, reached the Mississippi Central Railroad on November 29. Sherman had reached College Hill, 10 miles from Oxford, on

⁵25 RR 59, 656.

⁶25 RR 142.

⁷25 RR 655, 656.

⁸25 RR 654.

⁹25 RR 278.

¹⁰25 RR 311.

¹¹ Grant, 423.

¹²25 RR 728.

¹³25 RR 296.

¹⁴24 RR 470; Swinton, 271; Steele, 397.

December 5.¹⁵ Since Grant's long line of communications was over a single-track railway only, he established a large base at Holly Springs.

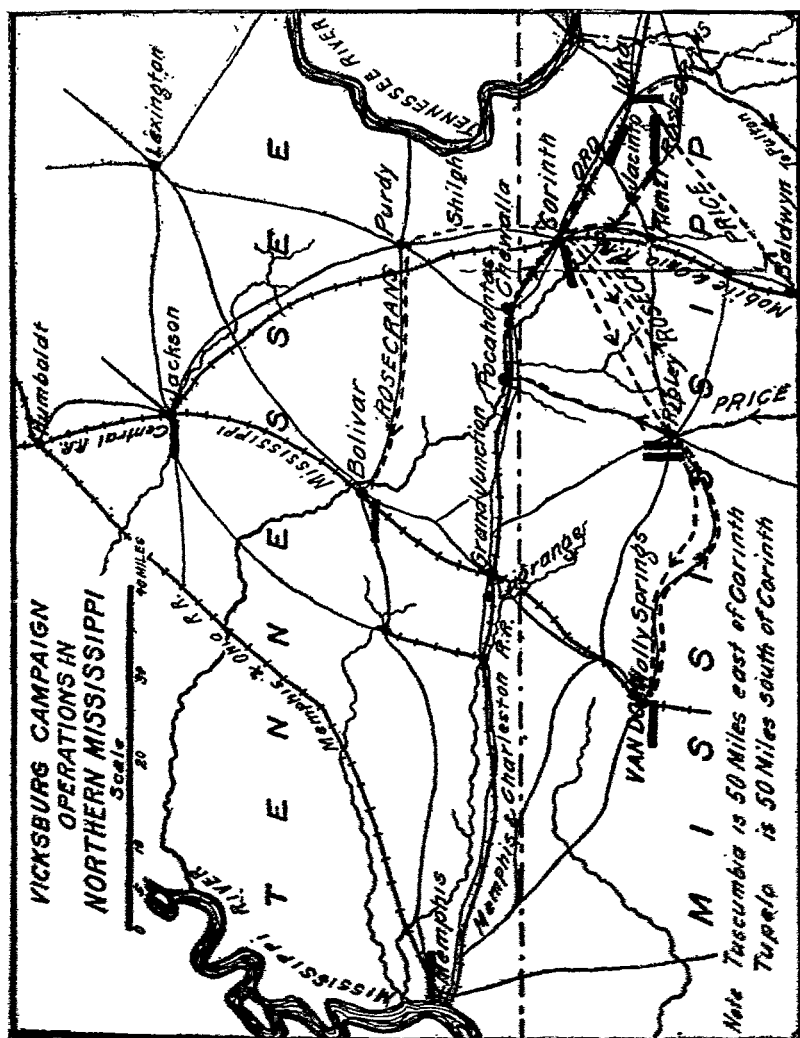


FIG. 2

Up to this time Grant had met with unexpected success. But realizing the danger of so long a line of communications, he now planned to divide his force. Sherman, with the troops at Memphis which had just been reinforced by new levies, as well as by those

¹⁵ Sherman, 281.

under Steele at Helena, was to be sent down the Mississippi to Vicksburg,¹⁶ while Grant, with the remainder of his forces, was to contain Pemberton.¹⁷ Accordingly Sherman, with one division, was sent back to Memphis on December 8.

Grant's line of communications, however, proved to be a very tempting bait to the Confederates. Forrest, leaving Columbia, Tennessee, on December 11 with his cavalry, crossed the Tennessee River, took Humbolt and Trenton, and reached Union City on the twenty-first. After damaging some sixty miles of railroad north of Jackson and destroying supplies all along the line, he recrossed the Tennessee River on January 1, 1863.¹⁸ In the meantime, Van Dorn, with some 3500 cavalry, surprised the garrison at Holly Springs, destroyed the vast amount of stores accumulated there, and, eluding all forces sent against him, made good his escape back to Grenada.¹⁹ As a result of these raids Grant withdrew all his troops north of the Tallahatchie,²⁰ sending word to Sherman of his action at the time. Sherman, however, did not receive this message until after he had attempted to carry out his part of the plan.

In the meantime, Sherman, having arrived at Memphis on December 12, embarked on the twentieth.²¹ He was reinforced by troops from Helena and, escorted by Porter's gunboats, arrived at Milliken's Bend on December 25. His force consisted of 32,000 men, organized into four divisions under M. L. Smith, A. J. Smith, G. W. Morgan, and Fred Steele.²²

The Federals landed on December 26, without opposition, on the east side of the river at Johnson's plantation. The next two days were employed in reconnaissance. The Confederate position was along a line of cliffs, known as Chickasaw Bluffs, which stretched from Vicksburg for twelve miles north to Hayne's Bluff on the Yazoo River. The space between the bluffs and the river was mostly a wooded swamp, cut up by bayous and creeks. There were only three approaches over this waste land: one a causeway near the center, one a shallow place half a mile north, and one a sand bar a mile south. This natural fortification had been strengthened by fallen trees and abatis, which were covered by rifle pits and batteries. The Confederates, learning of Sherman's expedition, had reinforced the defenses of Vicksburg by three brigades, so that at this time there were about 12,000 men present.

On the twenty-ninth of December, Sherman assaulted the Confederate position.²³ The main attack was made by Morgan in the

¹⁶24 RR 474, 601.

¹⁷1 Grant, 430.

¹⁸24 RR 593.

¹⁹25 RR 812; 1 Grant, 433.

²⁰25 RR 445.

²¹24 RR 601.

²²24 RR 601, 604.

²³24 RR 607.

center, reinforced by Steele's division which had made an unsuccessful attempt the day before to pass north of Chickasaw Bayou. M. L. Smith's division, on his right, attacked across the narrow sandbar, while A. J. Smith on the extreme right flank made an attempt to reach Vicksburg. The attack failed all along the line, and at night the Federals withdrew. In the battle Sherman lost in all nearly 1800 men, while the Confederates lost 207.

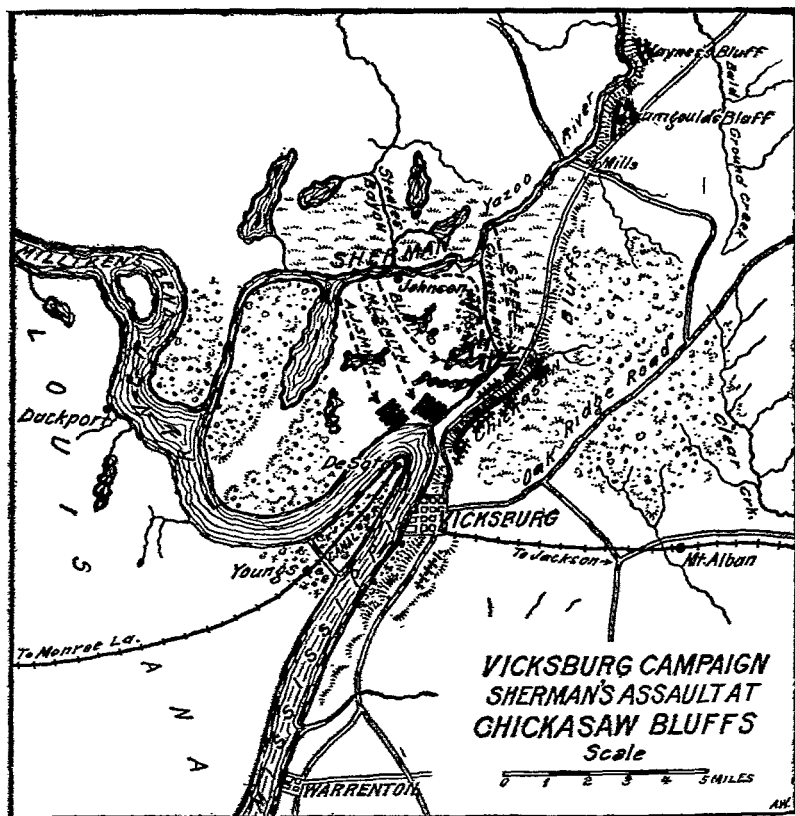


FIG. 3

Sherman remained for two days, but due to rain and fog plans for another attack were abandoned, and on January 2 the Federal forces re-embarked and returned to Milliken's Bend. Here Sherman first heard of Grant's withdrawal. At this time McClernand, who had just arrived, took command.

Sherman and Porter had no faith in McClernand's ability as a commander and in communications had acquainted Grant with their ideas

on the subject.²⁴ Grant himself had for some time doubted McClelland's capabilities and upon receiving these adverse reports decided to pay a visit to the command. On this visit his opinion was verified and he decided to take command in person. This was necessary in as much as McClelland was second in rank. The War Department issued orders to this effect and he arrived at Young's Point on the twenty-ninth of January, 1863,²⁵ taking over command on the next day.

At this time the troops in the command had been organized into four corps—the XIII, XV, XVI, and XVII—commanded respectively by McClelland, Sherman, Hurlbut, and McPherson.²⁶ He sent Hurlbut back to Memphis to guard his bases and lines of communication in that vicinity and McPherson to Lake Providence to open a water route to the south; and McClelland and Sherman were set at work digging a canal across the narrow neck of land opposite Vicksburg.²⁷

The purpose of the canal was to furnish a waterway to the high ground south of Vicksburg without running the gauntlet of the batteries at that place. This canal however was never completed,²⁸ and the work was definitely stopped on it when the dam,²⁹ which was protecting it, broke and the Confederate batteries located on the heights at Warrenton denied them the use of their dredges.³⁰

On the thirtieth of January, McPherson³¹ had been ordered to cut the levee at Lake Providence³² and clear a route by way of Lake Providence, Bayou Macon, Tensas, Wachita, and Red rivers to a point on the Mississippi just above Port Hudson. This would place the forces on the river two hundred miles below Vicksburg. Grant visited McPherson on the fourth of February and made a reconnaissance of the lake as far as it had been cleared. Seeing that this plan was not feasible, he decided to abandon this route but to continue the work for the purpose of employing the troops and covering other preparations. This plan and the canal plan were definitely abandoned the latter part of March.

A third plan consisted of sending Lieutenant Colonel Wilson,³³ a staff officer, to Helena, Arkansas, to open a route through Moon Lake, Yazoo Pass, Tallahatchie, and Yazoo rivers to the rear of Vicksburg. The Yazoo river levee was cut February 2, 1863, and on February 24³⁴ General Ross,³⁵ accompanied by gunboats, moved into the waterway with a force of 4500 men on transports. The progress of the expedition was impeded throughout the entire route by felled trees³⁶ and other

²⁴I. Ropes, 88; I. Grant, 440.

²⁵I. Grant, 441.

²⁶I. Steel, 399.

²⁷36 RR 10.

²⁸36 RR 14.

²⁹I. Grant, 447.

³⁰36 RR 123.

³¹I. Grant, 448; 38 RR 59.

³²38 RR 33.

³³36 RR 10, 386.

³⁴36 RR 373, 376.

³⁵38 RR 56.

³⁶36 RR 374.

obstructions placed by the Confederates. In spite of this, the force managed to arrive at Fort Pemberton by the eleventh of March. Two

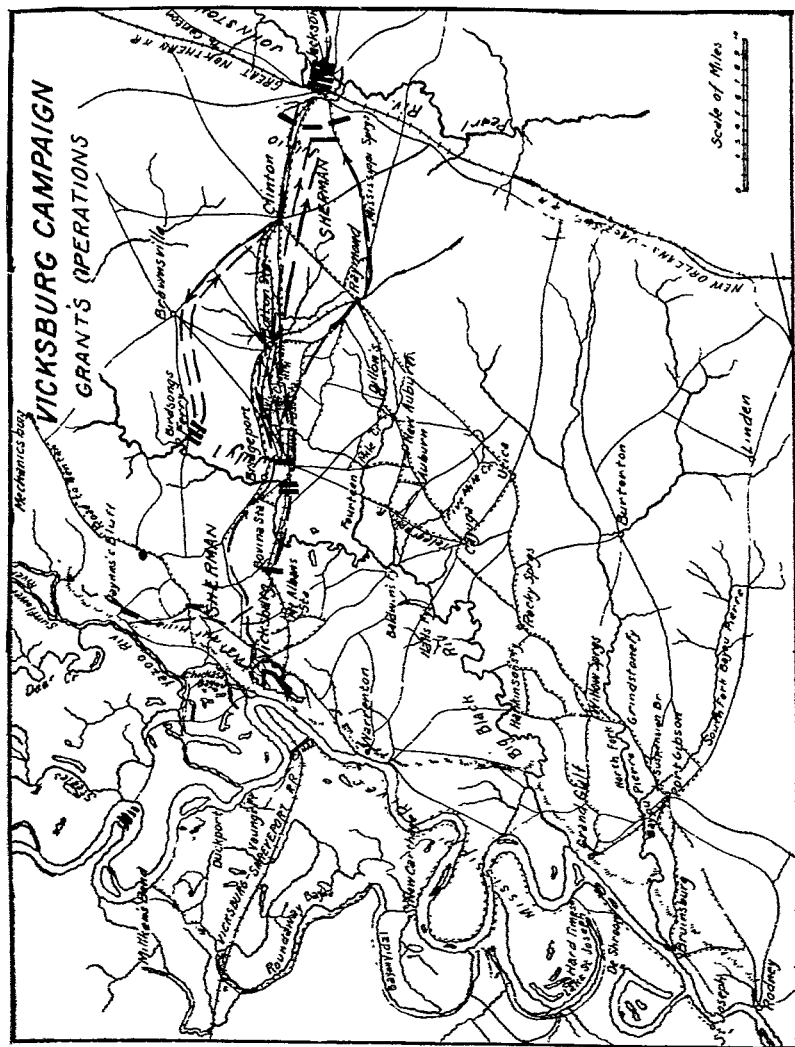


FIG. 4

gunboats attacked the fort on the eleventh and the thirteenth, but were unable to silence the Confederate batteries. This fort was constructed on a neck of land near the junction of the Tallahatchie and the Yalabusha rivers. It was practically an island with its surface two

or three feet above water. An attempt was made to flood it by a second cut in the levee but this failed to accomplish the desired result. Ross then started back to Helena and met Quimby with a brigade at Yazoo Pass.³⁷ Quimby, by virtue of his rank, assumed command and returned to Fort Pemberton but upon looking over the situation he decided not to attack and returned to Helena.

Having been turned back at Fort Pemberton, Grant then tried to find a route which would lead to a point below this fort and in rear of Vicksburg. In furtherance of this plan he selected a route³⁸ by way of Eagle Bend, Steele Bayou, Black Bayou, Deer Creek, Rolling Fork, Big Sunflower, and the Yazoo river. Porter reconnoitered this route to Deer Creek on the fourteenth of March and reported favorably upon it. The next day an expedition consisting of five gunboats, four mortar boats³⁹ and Stuart's division of the XV Corps, with Sherman in command, started out. On the nineteenth, Porter encountered sharpshooters hidden⁴⁰ behind trees. As he had no force to cope with this resistance, he sent word to Sherman on the night of the nineteenth acquainting him with the situation. Sherman immediately went back along the route of advance to the last transport,⁴¹ landed the troops on it, and marched twenty-one miles the next day to Porter's relief. The expedition however was not able to advance further and the plan was given up. The waterway in this case was so narrow that the boats had to be backed out stern foremost.

With the newspapers clamoring for his relief,⁴² Grant was now at his wit's end. He had but three plans left to choose from.⁴³ The first: To assault the Confederate batteries at Vicksburg. The second: To return to Memphis and advance along the Mississippi Central railroad. The third: To find a way across the swamps opposite Vicksburg to a crossing lower down the river. The first plan would be suicide and the second, although the most logical of the three, was prohibited because it would look like a retreat and public opinion would be too strong against it.

Having considered the facts Grant decided to adopt the third plan,⁴⁴ although it meant that he would have to cut loose from his base of supplies.

Having made his decision, Grant planned to move by way of the bayous on New Carthage, then to cross the Mississippi, and move on Vicksburg from the south and east.⁴⁵ The bayou route proved impracticable, but undaunted, he constructed roads and bridges and

³⁷36 RR 45, 407, 408; 38 RR 75, 86.

³⁸Porter, *Nav. His.*, 303

³⁹Soley, *Porter*, 290.

⁴⁰Porter, *N. H.*, 306.

⁴¹36 RR 435.

⁴²I Grant, 458.

⁴³I Steele, 402.

⁴⁴38 RR 131, 132, 151.

⁴⁵Sherman, *Memoirs*, I, 317; 36 RR 5.

arrived in New Carthage only to find it to be a place entirely unsuited to his purpose.⁴⁶ He then moved on to Hard Times,⁴⁷ opposite Grand

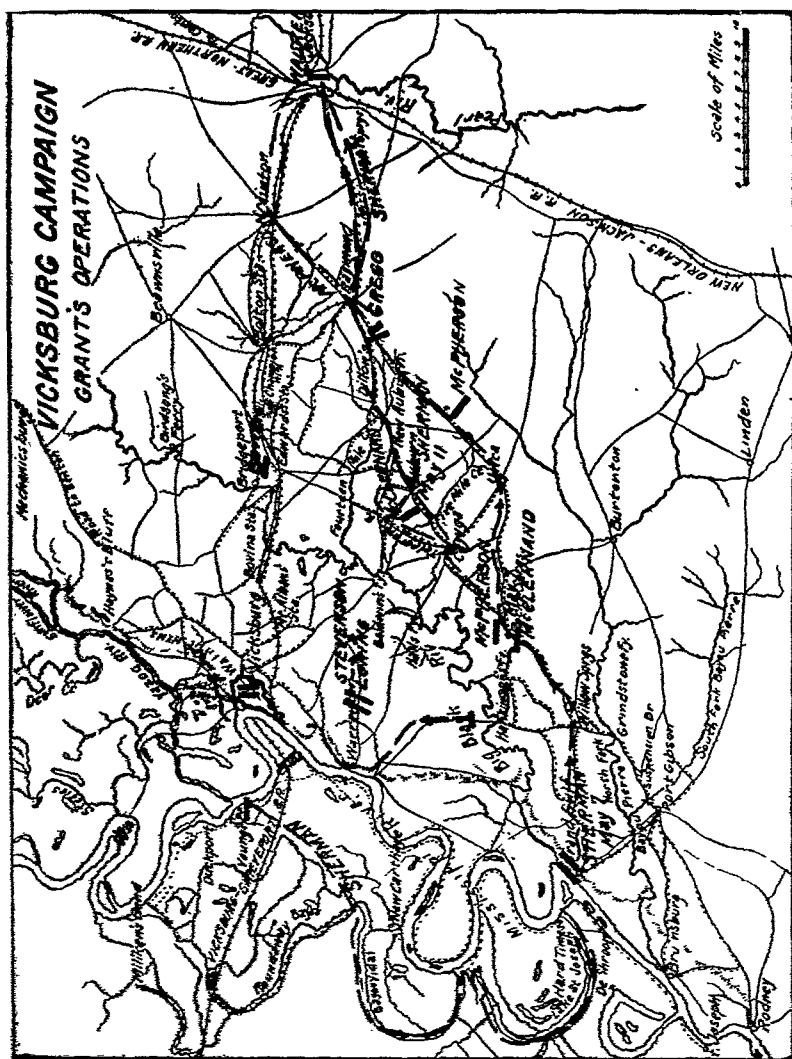


FIG. 5

Gulf, where by April 29 he had two Corps ready to cross—McClermand's and McPherson's.⁴⁸ Meanwhile certain transports and gunboats had run by Vicksburg and were on hand at Hard Times.⁴⁹

⁴⁶36 RR 47.

⁴⁷36 RR 47, 48.

⁴⁸36 RR 32.

⁴⁹Sherman's, *Memoirs*, I, 317, 318; 36 RR 5.

At this time Pemberton had about 50,000 Confederates in Mississippi, scattered from Port Hudson to Fort Pemberton, but Pemberton had no idea where Grant intended to strike.⁵⁰ There were excellent reasons for the mystification of the Confederates. Part of Sherman's Corps under Steele had been sent north to Greenville, making it appear that Grant might be returning to Memphis.⁵¹ Then Grierson made his famous raid with 1000 men from La Grange to Baton Rouge in sixteen days.⁵² The Confederates, having no cavalry at hand, were in a state of wild alarm, not knowing what the force was, nor knowing where it was at any particular time. This raid so completely diverted attention from Grant's movements around Hard Times that the garrison of Grand Gulf was not strengthened.⁵³

At 8:00 A. M. April 29, the gun boats moved toward Grand Gulf.⁵⁴ An artillery duel ensued with no apparent advantage to either side, so General Grant decided to make his landing farther down the river, the next day, eventually selecting Bruinsburg,⁵⁴ it being the first point below Grand Gulf from which the interior could be reached.⁵⁵ This information was received from a negro.⁵⁶

By noon the next day, April 30, McClernand's Corps had crossed without opposition⁵⁵ and, marching inland, met no enemy until about 2:00 A. M.. When they were eight miles from Bruinsburg or about four miles from Port Gibson, they met a detachment of Confederates which was forced to fall back. As it was dark, no pursuit was attempted.⁵⁷

Before morning a Confederate Brigade had reinforced the troops in front of McClernand.⁵⁸

At dawn the Federals attacked over very unfavorable terrain. At noon two brigades of McPherson's Corps came up and joined in the battle. Almost simultaneously, about the equivalent of two Confederate Brigades arrived. But these reinforcements were not sufficient for the Confederates, and, out numbered and out flanked by McClernand and McPherson, they gave way late in the afternoon, destroying the bridges as they retreated.⁵⁹

Grant now moved his base to Grand Gulf, which had been evacuated.⁶⁰

Pemberton began to concentrate his scattered forces, and this concentration was accelerated by the retreat of the troops from Port Gibson.⁶¹ The Confederates were followed by McPherson's Corps on

⁵⁰ Opinion of Committee.

⁵¹ Sherman's, *Memoirs*, I, 319.

⁵² 36 RR 21. 522, 529.

⁵³ 36 RR 48.

⁵⁴ 36 RR 258.

⁵⁵ 36 RR 32.

⁵⁶ 36 RR 48.

⁵⁷ 36 RR 48.

⁵⁸ 36 RR 258.

⁵⁹ 36 RR 49.

⁶⁰ 36 RR 49.

⁶¹ 36 RR 259.

May 3 as far as Hamkinson's Ferry,⁶² and McClelland halted at Willow Springs awaiting the arrival of Sherman's Corps which crossed on the seventh of May.⁶³

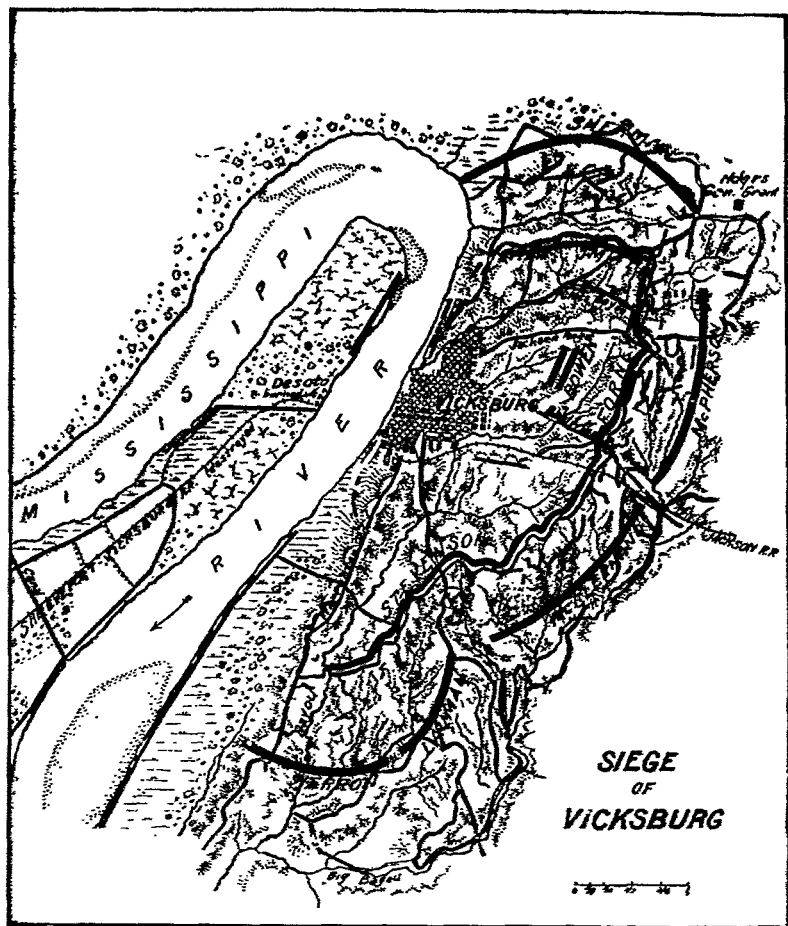


FIG. 6

Grant's Army east of the Mississippi now numbered about 40,000, while Pemberton still had about 50,000.⁶⁴ However, Grant's troops were concentrated and Pemberton's scattered. The troops at Port Hudson could not be counted upon as they were threatened by Banks and Farragut.⁶⁰

⁶²36 RR 49.

⁶³36 RR 50.

⁶⁴Opinion of Committee.

⁶⁵36 RR 25.

The War Department expected Banks and Grant to cooperate,⁶⁵ but Banks did not appear to be able to do much for Grant. Finally, when the latter was informed that Banks would cooperate in the capture of Port Hudson after May 10 with only 12,000 men, Grant decided that the best thing he could do was to follow up his own successes and give up all thought of cooperation with Banks.⁶⁶

Grant's information of the enemy was very meagre since he had but one regiment of cavalry with his army.⁶⁷ This he used generally in close reconnaissance.⁶⁸ He heard rumors that a force was being concentrated at Jackson and that led him to decide to march on the railroad between Jackson and Vicksburg in order to place his troops between the two Confederate armies.⁶⁹

On May 7, McClernand was ordered to take the road from Rocky Springs to Edward's Station, and McPherson to march by way of Raymond to Jackson. Sherman, in reserve was to follow on both roads.⁷⁰ Railroads and stores were to be destroyed.⁷⁰

Pemberton devoted his troops to guarding the crossings of the Big Black and appealed for reinforcements which were sent to him.⁷¹

As the Union troops crossed Fourteen Mile Creek on the twelfth, both McClernand's and Sherman's Corps had considerable skirmishing but the Confederates fell back without undue resistance.⁷¹

McPherson on the twelfth encountered two Confederate Brigades at Raymond, which, after some hours of fighting were soundly beaten.⁷¹

On the night of May 12, both McClernand and Sherman were directed to march on Raymond, this for the reason that the Confederates were reported to be concentrating there and that General J. E. Johnston was reported to be coming to take command in person.⁷² Grant intended to strike Jackson by way of Raymond.⁷²

Pursuant to these orders, McPherson and Sherman arrived in the vicinity of Jackson on May 14 and McClernand moved to Raymond on the thirteenth, sending a division to Clinton on the fourteenth.⁷³

At noon, the Confederates were engaged near Jackson on the Clinton Road by McPherson's Corps, while Sherman coming up on the other side of the town, soon succeeded in entering it. About two hours after the fight opened, the Confederates were in full retreat toward the north. Pursuit was not sufficiently rapid to catch the Confederates.⁷⁴

⁶⁵36 RR 49, 50.

⁶⁶*Opinion of Committee.*

⁶⁷36 RR. Report & Memoirs of General Grant.

⁶⁸36 RR 50.

⁶⁹36 RR 50.

⁷⁰36 RR 259.

⁷¹36 RR 50.

⁷²36 RR 50.

⁷³36 RR 51.

Grant learned that Pemberton had been ordered to move on and attack the Federal rear,⁷⁴ so having defeated the enemy at Jackson he was ready to move back on Edward's Station and attack Pemberton

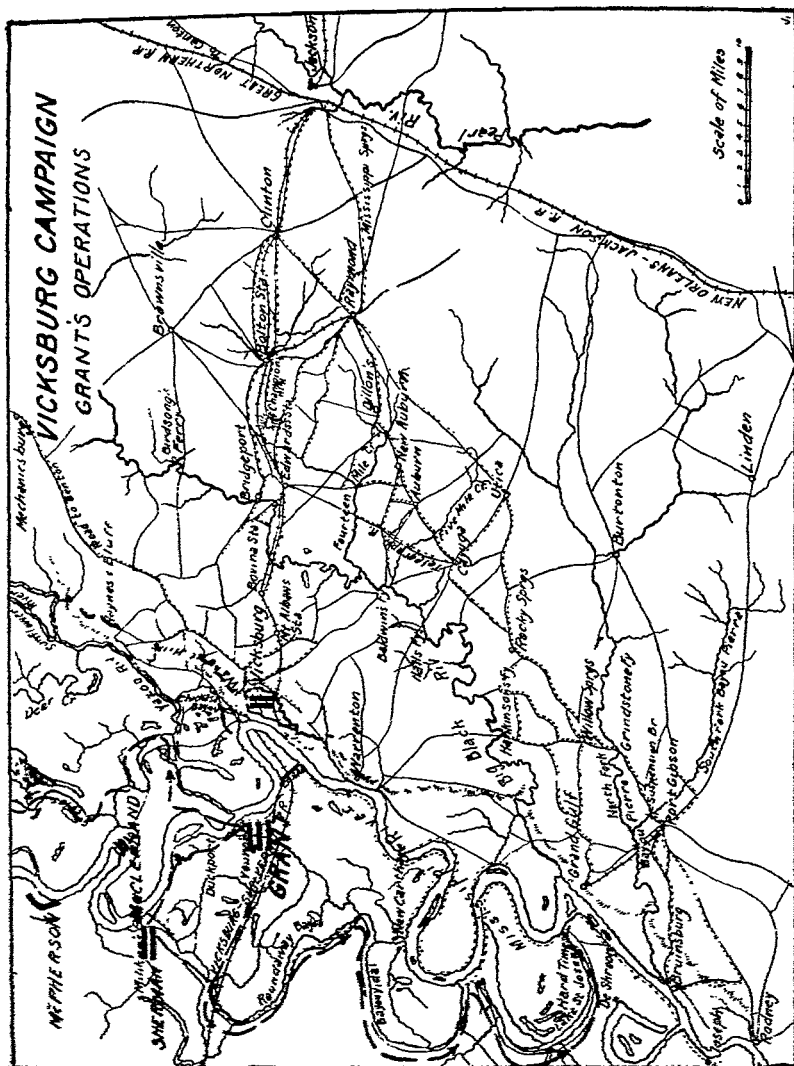


FIG. 7

before the latter could be joined by the troops just driven from Jackson. Orders to carry out the plan were given.⁷⁴

On the night of May 15, Grant's Army, except two divisions of Sherman's Corps which remained at Jackson carrying out missions of

destruction, was bivouacked on the roads leading west to Edward's Station.⁷⁵ Grant did not appear to be aware of the proximity of Pemberton, whose forces were but four miles away.⁷⁶

The Confederate line was formed across the two roads south of Champion's Hill, a steep rugged knoll.⁷⁷ The battle for its possession was very stubborn, but by dark the Confederates were in full retreat. McClernand was dilatory as usual. Had he attacked when he should have, or had his attack been strongly pressed, the defeat administered would have been far more complete.⁷⁸ McPherson's troops on the right must by this time have become excellent soldiers for the Confederates on that flank estimated their opponents to number 60,000 to 80,000.⁷⁹

Pemberton, too, had difficulties with his subordinates. Loring, when ordered to attack McClernand, refused because he felt that the latter held too strong a position. And later when ordered to reinforce Stevenson on the right he failed to do so. Pemberton lays the blame for Stevenson's rout upon Loring.

Grant now informed Sherman at Bolton of the result of the day's battle and directed him to change his direction of march so as to move upon Bridgeport.⁸⁰

Next morning (the seventeenth) the pursuit was instituted with McClernand's Corps in the advance,⁸⁰ and the head of the column made contact with the Confederates early in the morning, finding that they were posted on the east bank of the Black River,⁸¹ across a deep bend. In front of the Confederate line was a bayou which had all the effect of a moat.⁸²

The attack being made, the Confederates in the course of about an hour, broke and ran for the bridges in their rear. In fact, the withdrawal was so rapid and so sudden that Grant thought (and so reported) that the enemy initially manned both banks of the stream.⁸³

Sherman, meanwhile, arrived at Bridgeport, constructed a pontoon bridge and crossed the river on the eighteenth. He then, pursuant to orders, took the road toward Vicksburg, turning to the right when within 3½ miles of the city.⁸³

McPherson also crossed on the eighteenth and followed Sherman toward Vicksburg. McClernand moved to Mt. Albans and turned to the left; and by the morning of the nineteenth Vicksburg was invested, Sherman on the right, McPherson in the center, and McClernand on the left.⁸³

⁷⁵36 RR 51.

⁷⁶36 RR 51, 263.

⁷⁷36 RR 52, 264, 265.

⁷⁸36 RR 53, 262, 265.

⁷⁹36 RR 264.

⁸⁰36 RR 53.

⁸¹36 RR 266.

⁸²36 RR 54, 266.

⁸³36 RR 54.

Pemberton was now compelled to take refuge in Vicksburg. He left what remained of his army to be brought in by Stevenson and hurried on himself to prepare the defenses. On the eighteenth he received an order from Johnston to evacuate Vicksburg⁸⁴ but instead of trying to carry out the order he called a council of war⁸⁵ at which it was decided that a withdrawal was impossible. He made no further effort to obey Johnston's order.

By the night of the eighteenth Grant had established his base on the Yazoo⁸⁶ at Snyder's Bluff.⁸⁷

Within the fortifications Pemberton had Stevenson's division on the south, Forney's in the center, M. L. Smith's on the north and Bowen's in reserve, a total of 20,000 effective men.⁸⁸

Grant, now being located between Pemberton in Vicksburg and Johnston in Jackson, decided to assault the Vicksburg defenses⁸⁷ at 2:00 P. M., May 19. The assault was repulsed and he again assaulted on the twenty-second with like results.

It was now evident that Vicksburg could be taken only by siege, and accordingly it was completely invested with 71,141 men in twelve miles of trenches.⁸⁹ Siege operations were carried out until, on July 1, the approaches were within five hundred to one hundred yards of the defended works.⁹⁰ Orders had been issued for a final assault on July 6, but this was stopped by Pemberton's surrender on July 4.

During the siege Johnston had organized a force of 31,000 at Jackson with the intention of relieving Vicksburg.⁹¹ Grant had been reinforced by the divisions of Blair and Osterhaus which had reconnoitered in the direction of Mechanicsburg and the Big Black River for Johnston but had found no signs of his army.⁹²

Johnston had issued orders for an advance on June 28, but had held it up on the second, third, and fourth of July to reconnoiter. On the fourth he received word of Pemberton's surrender and immediately countermarched his command to Jackson.⁹³

Sherman, who had been covering the siege with a force of 30,000 on the line Haynes' Bluff—Black River Bridge, was close upon Johnston's heels⁹⁴ and immediately prepared to besiege Jackson. Johnston however was not to be caught and withdrew his forces across the Pearl River. Sherman was then recalled to Vicksburg.

Port Hudson surrendered to Banks⁹⁵ on July 9, and the Mississippi was then completely under the control of the Union forces.

⁸⁴I Grant, 522.

⁸⁵I Steele, 412.

⁸⁶I Grant, 527.

⁸⁷I Grant, 529.

⁸⁸I Steele, 413.

⁸⁹I Steele, 414; I Grant, 530.

⁹⁰I Grant, 538, 555.

⁹¹I Steele, 415.

⁹²I Grant, 544.

⁹³I Steele, 415.

⁹⁴I Grant, 576.

⁹⁵I Steele, 416.

COMMENTS

In its results, the campaign of Vicksburg was one of the most important of the Civil War. It practically ended the Confederate control of any part of the Mississippi Basin and reduced the war in that section to minor engagements between small bodies.

In his conduct of the campaign General Grant proved himself to be a general of great ability. He had failed in five different projects for the capture of Vicksburg: first, the combined movement in which he was to march a force overland from northern Mississippi against the rear of the town, while Sherman moved by transports down the river. This enterprise was frustrated by the capture of Grant's advanced base at Holly Springs by Van Dorn's Cavalry, by the breaking up of the railway in his rear by Forrest, by Sherman's failure to defeat the Confederates at Chickasaw Bluffs. The second effort was by way of the canal across the peninsula opposite Vicksburg; the third was by way of Lake Providence and bayous and rivers west of the Mississippi; the fourth was the expedition by way of Yazoo Pass; the fifth was the expedition by way of Steele's Bayou. All these projects had failed, but still Grant was undismayed by the difficulties of his position, holding firm to his purpose to land an army on one flank of the Confederate line of defense. Having decided to take the risk of running the transports through the Vicksburg batteries, without waiting to see the results of his venture, he started his army overland for New Carthage.

When Grant landed his army on the east bank of the Mississippi he did not know the strength nor the disposition of Pemberton's forces. With directness and decision he united his available forces and attacked Bowen with overwhelming odds.

When Sherman joined Grant, the position of the Federals was an unenviable one. Grant could not base his army on Grand Gulf, since every ration landed at that point was either brought by wagon over the single earth-road between Milliken's Bend and Carthage, or in boats that ran the batteries at Vicksburg. He was obliged to secure a base elsewhere.

Grant therefore decided to cut loose from Grand Gulf and move around Vicksburg to the Yazoo River. If Pemberton moved out to attack him, he would be compelled to attack him with only a part of his army or to evacuate Vicksburg. Accordingly he kept his own corps united for the expected battle.

At Raymond, General McPherson unexpectedly encountered Gregg's brigade which retired on Jackson and led Grant to investigate that place. Here he intercepted a letter from General Johnston to General Pemberton in which the latter, thought to be at Edwards Station, was requested to advance on Clinton and cooperate with Johnston. Grant at once decided to attack Pemberton.

This he did at Champion Hill. Pemberton was decisively defeated and fell back on the Big Black River to a prepared bridgehead but Grant's pursuit was so rapid that Pemberton withdrew within the defenses of Vicksburg and Grant was free to obtain for himself a base at Snyder's Bluff on the Yazoo River, above Vicksburg. In this operation he had not only prevented the junction of the enemy forces, but had still further scattered their detachments; so that they had fully 14,000 fewer men available at Vicksburg at the close of this period than at the beginning. During these eighteen days Grant's men had had but five day's rations, had marched 200 miles and had defeated the enemy's forces in four engagements, at Raymond, Jackson, Champion's Hill and Big Black. All fought within six days; he had inflicted losses of 8000 in killed, wounded, and missing and captured 88 pieces of artillery, and, most of all had driven the enemy into the narrow defenses of Vicksburg and his total losses had been less than 3500.

From this point on we have the investment followed by the siege of Vicksburg, for which Grant brought up additional troops to carry his operations to a successful conclusion.

Had the Confederate leaders grasped the situation as clearly as did Grant, Pemberton would have remained west of the Big Black River and Johnston would have retreated to the south. If Grant forced a crossing of the Big Black River, it would have been north of the railroad and Johnston could have entered Vicksburg from the south. Grant probably could not have been prevented from establishing his base on the Yazoo River, but Johnston and Pemberton would have been united to meet his advance southward from that base.

While Grant was moving down the west bank of the Mississippi from Milliken's Bend the attention of the Confederates was diverted from the movement by a daring raid made by Grierson with a small brigade of cavalry. By operating on the Confederate line of communications and preventing the early concentration of any reinforcements he contributed largely to the success of the major operations of Grant. This expedition was most successfully conducted and stands apart as the greatest cavalry exploit of the Civil War.

When we consider the character of the country in which the Federal Army operated, the formidable obstacles to be overcome, the number of the Confederate forces and the strength of their works; the courage and endurance of the troops and the skill and daring of their commander must be admired. Few more brilliant operations can be found in military history.

MAXIM LXIII

All the information obtained from prisoners should be received with caution, and estimated at its real value. A soldier seldom sees anything beyond his company; and an officer can afford intelligence of little more than the position and movements of the division to which his regiment belongs. On this account the general of an army should never depend upon the information derived from prisoners, unless it agrees with the reports received from the advanced guards, in reference to the position, etc., of the enemy.—Napoleon's Maxims of War.

Genghis Khan

1ST LIEUT. L. D. FLORY, C. A. C.

IN our military careers we spend much time in perfecting ourselves in the technical and tactical part of our profession. We go to schools and learn tactics, transportation, gunnery, supply, administration, organization, etc. We study training regulations, mimeographs, and special manuals. We read professional journals and papers. But all these different means of instruction have been confined with but slight exception to material things only, the machinery of war with the officer and soldier as part of that machinery.

The study of the soldier, that important cog in the machinery of war has been left out of our consideration. What will our knowledge of tactics and technics avail us if we can not train the soldier, if we can not control or direct him, or inspire him so as to bring about maximum results? We would be tacticians and technicians but not leaders. Certainly no knowledge is of more importance to the officer ambitious to achieve leadership than his knowledge of man. Pope said that "the proper study of mankind is man," and we might add that the proper study of leadership is leaders.

How are we going to make these studies? No one can give us a formula that will give us that divine spark of leadership or that understanding of man. It is something that we must develop ourselves. We learn by experience and sometimes it is very bitter. Bismark said, "Fools learn by their own experience: I learn by the experience of others." This experience of others gives us another way to make these studies. We can read and re-read biographies, autobiographies, and memoirs of great leaders with a view to studying the qualities of leadership as developed by these great men.

We look to history to find the great leaders and find Alexander, Caesar, Hannibal, Napoleon, and others. Of these Napoleon appears to be the most widely studied; but we are asked to remember that Napoleon abandoned one Army to its fate in Egypt, left the remnant of another in the snows of Russia, ended his career at Waterloo, and lived to see his Empire fall apart.

At this late date we now hear of a leader, greater than Napoleon and acclaimed to be the greatest military leader that ever lived. We have to look back seven hundred years into the Gobi desert to find this man who has mystified historians. What are his achievements? This

man, a nomad, a hunter, and a herder of beasts, conquered over one-half the known world. This barbarian who had never seen a city and did not know the use of writing drew up a code of laws for over fifty different peoples. So strong was his rule and so complete was his conquest that his empire endured for two generations after his death. He has been called at different times in his life "the mighty man-slayer; the perfect warrior, the master of thrones and crowns, and the Emperor of all men." He is better known to us as the Mongol, Genghis Khan.

Why have we not studied this gigantic figure of history? The reason is this—Mr. Lamb, in his recent biography of Genghis Khan, presents to us for the first time in English the story of this remarkable leader.* His task of compiling the life of Genghis Khan was no simple matter. The Mongols could not write, and consequently left no record. What few records do exist were written by his enemies. An expedition of English scholars from Cambridge has been sent out to decipher documents in Persia, Russia, and China. If we are fortunate, more light may be thrown on this remarkable man.

In order that we may better understand him, let us first find out who the Mongols were and what they were like. The Mongols were nomads banded together into tribes and lived between the Northern Gobi and the region south-east of Lake Baikal. Their existence depended on their plundering, their hunting and their herds. Their home was a tent of felt, mounted on a cart drawn by a dozen or more oxen. "Men clothed themselves in the skins of animals and nourished themselves on milk and flesh. They greased their bodies to keep out cold and moisture." Their life was spent in the saddle, hunting in the winter months, constantly seeking better grazing grounds for their herds, and fighting whenever necessary. Warfare was constant between tribes, and the chieftain who could afford the most protection would have the largest following. Life mattered little in those barren regions. It was even odds whether they starved, were frozen to death, or were cut down by the weapons of their enemies. A wise counselor, in comparing the life of the nomads to the life of the civilized races, once said to the boy Genghis Khan, "When we can we plunder, when we cannot we hide away. If we begin to build towns and change our old habits, we shall not prosper; besides monasteries and temples breed mildness of character, and it is only the fierce and warlike that dominate mankind."

Thus began the life of Genghis Khan, son of a minor chieftain of the Gobi, born to suffering—and acquiring in his youth the greatest endurance and cunning. At the age of thirteen he inherited the leadership of forty tribes of nomads. He was soon deserted by these tribes

**Genghis Khan: The Emperor of All Men*, by Harold Lamb. (McBride, 1927.)

and was hunted and harried by rival tribes. Undaunted by his reverses he set out to claim his rightful heritage and soon proved his ability to protect his tribes. His first conquest was against his neighboring tribes. This was accomplished with great difficulty since his forces were small. However, he proved his ability as a leader and men and tribes flocked to his standards for protection. "He soon had under his hand a disciplined mass of heavy cavalry capable of swift movement in all kinds of country."

The Gobi had been conquered and he then turned his attention to the great civilized country of China, then called "Cathay, which lay behind the Great Wall. Three mounted divisions galloped to the South, Southwest and West to clear his flanks and he was ready for the invasion of Cathay." "Our dominion is now so well ordered that we can now visit Cathay. Is the dominion of the Golden Khan so well ordered that he can receive us? We will go with an Army that is like a roaring ocean. It matters not whether we are met with friendship or war. If the Golden Khan chooses to be our friend we will allow him the Government under us of his domain; if he chooses war it will last until one of us is victor, one defeated." Invasion took place and soon the China dynasty passed into History. The veteran, Muhuli, one of the generals of the Mongols, was left to take care of the military government.

Northern Asia now had one Emperor. Tribal warfare ceased for the first time in history. It was said that a virgin carrying a sack of gold could ride unharmed from one border of the nomad empire to the other.

West of Genghis Khan's empire was the great mountain network of mid-Asia extending roughly northeast and southwest of the Taghdumbash, the roof of the world. All conquests of history previous to this time whether from the East or from the West had been stopped by this insurmountable barrier. What then made Genghis Khan turn westward in his conquest? An insult to the Khan by Mohammed Shah, ruler of the Turks, in beheading an envoy of the Khan's brought the golden horde across this barrier. No mountain range would ever prove a barrier to Genghis Khan.

In the Autumn of 1219, 200,000 veterans began the greatest march in military history. Two thousand miles of mountain ranges, through which there were only trails, had to be traversed before reaching the enemy. One has only to read the article, "By Coolie and Caravan across Central Asia," in the October, 1927, issue of the *National Geographic Magazine*, by William J. Morden, of the Morden-Clark expedition, to learn of the difficulty of travel and the hardships endured in crossing

these same mountains; and this by a modern expedition. It was only the great endurance of the Mongols which enabled them to pull through the many hardships encountered in crossing these snow-covered ranges. "They could sleep under drifting snow, and when food failed they opened a vein in a horse, drank a small quantity of blood and closed the vein." By spring the Armies of the Khan were ready to advance on the Shah. They harried him first on the one side and then on the other. Their engines of war laid siege to the strongest walled cities. The Shah fled. Subotai, the ablest leader of the Khan, and Chepe Noyon, with two tumans (20,000 men), were given the following order. "Follow Mohammed Shah wherever he goes in the world; find him alive or dead." The Shah, terrorized, fled to an island, where he died, defeated and alone, while Subotai, with his 20,000 men, went on searching for him into the Crimea and as far as the Dnieper River. There is no telling how the course of civilization might have been altered if Subotai had crossed the Dnieper. No army in Europe could have stopped him and he could have continued to the Atlantic. However, Genghis Khan called Subotai back and ended what is still and will probably remain the greatest feat of cavalry in military annals. These two divisions galloped over ninety degrees of longitude into Europe carrying destruction in their wake and galloped back again loaded with booty in less than two years. Thus, Genghis Khan, in the short span of his life, out-generated the powers of three empires and brought the entire territory from Armenia to Korea and from Tibet to the Volga under his domination.

The popular misconception of historians who represent the Mongols as a wild horde carrying all before them solely by their multitude is erroneous. The army of Genghis Khan was a well-organized, well-disciplined army. It had a permanent organization in units of ten to ten thousand. An organization of 10,000 was called a Tuman—several tumans to the division. The Mongols rode on horses covered with black lacquered armor and each man usually took two or more horses with him on a campaign. They carried bows and lances, and the men in the shock cavalry had axes. The greatest army of Genghis Khan never exceeded 200,000. His battles were won by consummate strategy and were not due to a mere overwhelming superiority of numbers, for he was frequently out-numbered by his enemies. Mobility and fighting power were his chief assets. He never violated the principles of war as we know them today. His system of spies furnished him with all the essential information of the enemy. His advances were always screened by scouts. His tactics were far superior to his time. He was careful in his selection of his leaders. Of one leader he

said, "No man is more valiant than Yessoutai, no one has rarer gifts. But as the longest marches do not tire him; as he feels neither hunger nor thirst he believes that his officers and soldiers do not suffer from such things. That is why he is not fitted for high command." Thus, with this well-disciplined and organized army of hardened and devoted soldiers led by tried leaders with their superior knowledge of strategy and warfare, it does not seem hard to realize why the Mongols seemed to their enemies to be invincible.

The life of Genghis Khan exemplifies the qualities of a leader. His character was extraordinary. However, the only exception to this was his cruelty to conquered peoples, whom he practically exterminated. His courage was undaunted; he was ever in the thick of battle. His word was his bond; he was just, as well as hard. He possessed great endurance, spending the greater part of fifty years in the saddle and campaigning until his death. His initiative and aggressiveness were great. "The merit of an action," he told his sons, "is in finishing it to the end." His decisions were simple and quickly reached and he never failed to take advantage of every mistake of his enemy. His understanding of men enabled him to pick his subordinates with great skill. His administrative and executive ability enabled him to rule his empire after he conquered it. He could inspire his troops to superhuman tasks. His knowledge of strategy and warfare was far ahead of his time.

MAXIM LIV

Artillery should always be placed in the most advantageous positions, and as far in front of the line of cavalry and infantry as possible, without compromising the safety of the guns.

Field batteries should command the whole country round from the level of the platform. They should on no account be masked on the right and left, but have free range in every direction.—Napoleon's Maxims of War.

Coast Forts in Colonial Connecticut

ADRIAEN BLOCK, a Dutch navigator, discovered the Connecticut River in 1614 and explored its waters as far as the site of Hartford; and shortly afterwards Dutch merchants were trading profitably along its shores. This stream, although lying within the territory claimed by the English, ultimately became the eastern boundary line of New Netherland. For eighteen years the Dutch traded upon the river with no thought of founding a permanent establishment upon its banks. Not until the English began to venture into the territory did the Dutch attempt to occupy it.

In 1630, the Council of Plymouth, in England, granted the lands west of the Narragansett to the Earl of Warwick, who, in the following year, transferred his interests to Lord Say and Seal, Lord Brooke, John Hampden, and others. The Dutch were, of course, aware of these movements of the English and of the exodus from England which began about this time. Becoming alarmed, they felt that they must give visible proof of their possession of the territory, so, in 1633, they purchased about twenty acres of land at Hartford from the Indians, and "made a slight fort, and planted 2. peeces of ordnance" upon it. The fort, which they named the House or Fort of Good Hope, was intended to keep the English from ascending the river.

Informed by the captain of a Dutch boat of the good trading on the "Quaneh-ta-cut" River and invited by a Mohegan chief to settle in that fertile region, the colonists at Plymouth determined to establish a colony on that river. In October, 1633, a company arrived on the Connecticut in a bark under the command of Captain George Holmes, who brought with him the frame of a house. Holmes was surprised at finding Fort Good Hope blocking his passage, but he was not intimidated and refused to obey the command of Jacob Van Curler, the Dutch commandant, to "strike and stay." Although threatened by the Dutch artillery, he sailed by unhurt, and proceeded to the mouth of the Farmington River, near the site of Windsor, where he landed and quickly "clapt up" his house and a palisade to protect it.

In the meantime, Lord Say and Seal and his associates, having secured all that territory "which lies west from Narragansett river, a hundred and twenty miles on the sea coast; and from thence in latitude and breadth aforesaid, to the South Sea," sent there John Winthrop, son of the governor of Massachusetts, to establish their colony and to be its governor. Winthrop arrived in November, 1635, and took

possession of the mouth of the Connecticut with about twenty men. To prevent the Dutch from ascending the river and to protect his own settlement, he built a small fort which was later called Fort Saybrook.



For a long time this fort continued to be a place of considerable importance, and it was generally kept well manned and equipped. The original fort, located on or near the point of Tomb Hill, was built of wood, but it was consumed by fire in 1647.

In 1639 Colonel George Fenwick, one of the original patentees, who had visited Fort Saybrook three years earlier, arrived from England to take charge of the little colony. His associates having abandoned their intention of removing to America, he looked after their interests until 1644. The settlements up the river recognized the right of the Saybrook patentees to the territory, and for a number of years, even after their own civil government had been established, continued to pay a tax or toll to Fenwick, as the representative of the proprietors. Finally the colonists decided to purchase the rights of the Warwick patentees.

At the General Court in the spring of 1644, a committee was appointed to treat with Colonel Fenwick concerning the purchase of Saybrook. The negotiations ended with payments aggregating sixteen hundred pounds sterling, and Fenwick returned to England. The Connecticut authorities took over the fort and rebuilt it in 1647 of more substantial material, placing it a few rods further north on New Fort Hill.

The Dutch still remained to contest English control in Connecticut. The English had never seriously attempted to force their removal, and Fort Good Hope, tiny though it was, continued to be occupied by the Dutch until 1654. In that year the colony received instructions from England to treat the Dutch as enemies, so the Council "ordered and declared that the Dutch Howse of Hope, with the lands, buildings and fences thereto belonging bee hereby sequestered." The fort and the buildings were duly "sequestered" and the Dutch removed from their holdings on the river.

By virtue of the patent of 1674, New York laid claim to the lands on the west side of the Connecticut River, notwithstanding the prior patent of Connecticut; and the boundary line remained a matter of dispute for many years. In 1675 Sir Edmond Andros visited the Connecticut with a small naval force for the purpose of securing possession of the disputed territory. His voyage was ostensibly for the purpose of offering assistance against the Indians, but the authorities of Connecticut were informed of his designs and had given Captain Thomas Bull, commanding Fort Saybrook, instructions concerning the situation. Unable to bluff Bull and unwilling to fire upon the English flag, Andros wisely gave up his intentions and returned to New York.

Like all the early colonial forts, Saybrook required constant repairs. Rebuilt in 1676, it was soon again in decay. Captain Robert Chapman, who had succeeded Bull in command, reported "that the fort house, together with the fortification, is near finisht" in 1676, but it was necessary to order repairs in 1680 and again in 1689. The re-

pairs were largely ineffective, as is shown by the report of a Committee appointed in 1693 to investigate the condition of Fort Saybrook. "Wee find that such are the Ruinous decayes of ye said fort, that the small matter of charge by your honour proposed will bee all together insignificant and worth less both to their Majesties and this Colonye's Interest, the Gates are all down but one, and one of them gone, both Wood and iron therrof ye hooks of the greate Gate stole; most of ye Iron of one of ye Carriages with all the iron of another, taken away; the Platformes all Rotten and unserviceable; part of ye stone wall yt supports the mount fallen down, most of the mud wall decayed, with the Palasados agt itt; abuott Four Rodd of plank Wall on the north that never was done, and Lyes open, the Jack, Jack staff and Piller to be repaired with new, most of ye great shott pilfered and gone, and according to our favourable judgmt doe Compute ye Charge, to be noe less than Fifty pounds to put itt in a defensive posture."

The only other coast fort in the province was at New London, which had been founded in about 1638. In 1693 it was commanded by Captain John Prentiss, but was in no better condition than the fort at Saybrook. For the purpose of providing money for the maintenance of these forts, a duty was laid in 1694 on all incoming vessels, and the forts were ordered repaired. These two forts were maintained into the eighteenth century, but little or no improvements were made on either of them. They had been repaired in 1701, but by 1709 they were both in an advanced state of decay.

In 1729 the General Court appointed a committee to inspect the fort at New London to determine whether to repair the old fort or to build a new one. For the purpose of providing protection pending the report of the Committee, a small appropriation was made for erecting a battery at that place.

Following the recommendations of the Committee, the General Court, in 1730, appropriated money for rebuilding the fort. "We have had a fort at New London long since, and several pieces of cannon, but are now [September, 1730] building a new fort where are already mounted four cannon to secure that port, and a short time intend divers more shall be there mounted." The work was not immediately finished, and in 1734 the General Court ordered it completed so as to mount eight cannon. The new work was to consist of a parapet one hundred feet long from the northerly corner, three feet in height and four and a half feet in thickness. At the southern end, the parapet was to be prolonged at an angle to the shore for the protection of the battery.

In all the early life of the colony, Saybrook was the most important point on the shores of the province, but as time passed, New London and New Haven increased in importance, while Saybrook languished. Little is heard of Saybrook in the eighteenth century, and the settlement approached dissolution. During the long interval of peace between the second and the third intercolonial wars, the defenses of the coast towns were almost completely neglected. When war broke out, the inhabitants were, as usual, much disturbed over their lack of defenses, and petitioned the General Court for protection. A New London petition recited "That ye Town and Port of New London is in a very naked and defenceless Condition."

In 1739 the General Court ordered ten cannon for the works at New London, and in 1744 fifteen additional guns were ordered, while in 1743 a battery to consist of two 12-pounders and one 4-pounder was ordered erected on the west side of the harbor at or near Harriss' Point. The fort was repaired in 1745 and again in 1755, yet in 1756 Governor Fitch found it necessary to report to the Board of Trade that the only fort in the colony was a "small battery" at New London, mounting nine guns (three unserviceable), twenty-two carriage guns and twelve swivel guns taken from the sloop belonging to the colony. Saybrook, by this time, had fallen into decay and had probably been abandoned.

Plans were prepared by James Montresor in 1756 for fortifications at New London, but no action seems to have been taken at the time, and in 1757 the garrison was "dismissed," although Captain Thomas Hurlburt was retained in command of the works. The following year Colonel Stephen Lee was sent to take charge of the defenses at New London and to enlist a garrison of twenty men, but in 1759 Hurlburt was reassigned to the command of the post, a command which he continued to exercise until the advent of the Revolutionary War.

The approaching conflict with the mother country caused Connecticut again to look to her coast defenses, and in 1775 the citizens of New London and Groton began the erection of a fort on each side of the Thames River. Fort Griswold, at Groton, a "block-house with embrasures," stood upon a hill which was not commanded by any ground within range of the cannon of the day. In connection with a battery at the water's edge and another south-east of the fort, both commanded by its guns, the fort covered all approaches available to an enemy.

Fort Trumbull, a more pretentious work on the New London side of the river, was commanded by a range of hills in its rear and right

at such a short range that the fort would become untenable as soon as an enemy should mount artillery on them.

In 1776 General Knox inspected the defenses at New London and reported that the harbor was safe and well protected. In that same year Captain Shapley was assigned to the command of Fort Trumbull and Colonel William Ledyard to the command of Fort Griswold. Later Colonel Ledyard was given the general command of both positions. In 1777 and 1778 he strengthened and enlarged the works on both sides of the river, and in 1779 he threw up works at Town Hill.

Black Rock Fort was built in 1776 and equipped with three field pieces under Lieutenant Bishop; Fairfield built a battery on Grover's Hill Point and in 1778 presented a bill therefor to the state; additional guns were ordered mounted at Fort Griswold; and troops were ordered to Fairfield and New London. By 1779 the works at New London had mounted in them fifty-eight guns from four-pounders to eighteen-pounders, including guns on traveling carriages.

In the course of the early part of the war, practically all the coast towns were provided with defensive armament and with troops. At the session of the State Assembly of January, 1779, it was "*Resolved by this Assembly, That for the defence of the sea coast of this State there be forthwith raised by voluntary enlistment, to serve for the term of one year unless sooner discharged, the several companies to be posted . . . viz: at each of the towns of New Haven, New London and Groton, one company of seventy men each, including officers; at Fairfield, one company of fifty men, including officers; at Stonington, Saybrook, and Milford, each, a company to consist of twenty men, including one serjeant and one corporal commanded by a lieutenant; at Norwalk, Stamford and Greenwich, each, a company to consist of the same number of men that were ordered to said towns respectively the last year, including a serjeant and corporal commanded by a lieutenant. . . . And William Ledyard, Esq^r, is appointed Major and Commandant of the aforesaid companies to be stationed at New London, Groton and Stonington.*"

In August of this year the artillery around New London comprised: at Fort Trumbull, ten guns mounted; at Fort Nonsense on Town Hill, two 12-pounders, three 9-pounders, and four 6-pounders; in New London, two 12-pounders and two 3-pounders; at Fort Griswold, twenty-four guns mounted; in Groton, one 12-pounder and two 4-pounders; battery at Groton, eight guns mounted; and at Norwich, four 6-pounders; a total of sixty-two pieces.

At New Haven, Beacon Hill on the east side of the harbor was fortified in 1779 with a fort named Fort Wooster, but in July, Tryon, with twenty-six hundred Hessians and Tories, captured New Haven, and burned East Haven, Fairfield, and Norwalk.

In 1781 the successful operations of the American forces in the South caused Sir Henry Clinton to send Benedict Arnold to New London on a raid as a means of creating a diversion. Even at this time the works around New London were inconsequential. Fort Trumbull was merely a strong three-sided breastwork, open at its rear, with a garrison of twenty-three men under Captain Adam Shapely. Fort Griswold, under Captain William Latham, was "an oblong square with bastions at opposite angles, its longest side fronting the river in a north-west and southeast direction, its walls of stone 10 or 12 feet high on the lower side and surrounded by a ditch; in the wall pickets projected for over 12 feet; above, a parapet with embrasures and within a platform for cannon, with a step to mount to shoot over the parapet with small arms."

On the sixth of September the enemy appeared. Fort Trumbull was manifestly untenable, so, when the enemy advanced, the garrison fired one volley, spiked their guns, and crossed the river to Fort Griswold. This fort was quickly invested, and the attack was begun. The plucky garrison of about one hundred and fifty men, consisting chiefly of hastily assembled militia, defended the fort with great resolution and once repulsed the enemy. The result was, however, a foregone conclusion, and after a sharp engagement the fort was captured. Following the combat, many of the Americans were killed by Arnold's men. We are told of cart-loads of wounded being rolled over the edge of the steep hill and being fired upon by the British. All but about forty of the American garrison were killed or wounded during or subsequent to the attack. After the conclusion of the battle, the British entered New London and Groton and laid them in ashes. Arnold then led his forces back to New York.

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MAXIM LXXVI

The qualities which distinguish a good general of advanced posts are: to reconnoiter accurately defiles and fords of every description; to provide guides that may be depended on; to interrogate the curé and postmaster; to establish rapidly a good understanding with the inhabitants; to send out spies; to intercept public and private letters; to translate and analyze their contents; in a word, to be able to answer every question of the general-in-chief when he arrives with the whole army.—Napoleon's Maxims of War.

The Military Situation of Belgium

By LIEUT. J. D. MITCHELL, C. A. C.

BELGIUM, as a military power, does not play an important part in the line-up of nations. In the field of international politics, however, she has a very important place.

Belgium has an area of 11,752 square miles, about one-fourth of the area of the state of Pennsylvania. In shape she is compact, but is lacking in natural frontiers. On her northwest is about sixty miles of coast line on the North Sea. She is bounded on the north by Holland, on the east by Germany and Luxembourg, and on the south and west by France. She had a population of 7,879,601 in 1926 or a population density of 670 inhabitants per square mile. The western part of the country is low, level, and fertile; the eastern part is higher and hilly and has a poor soil.

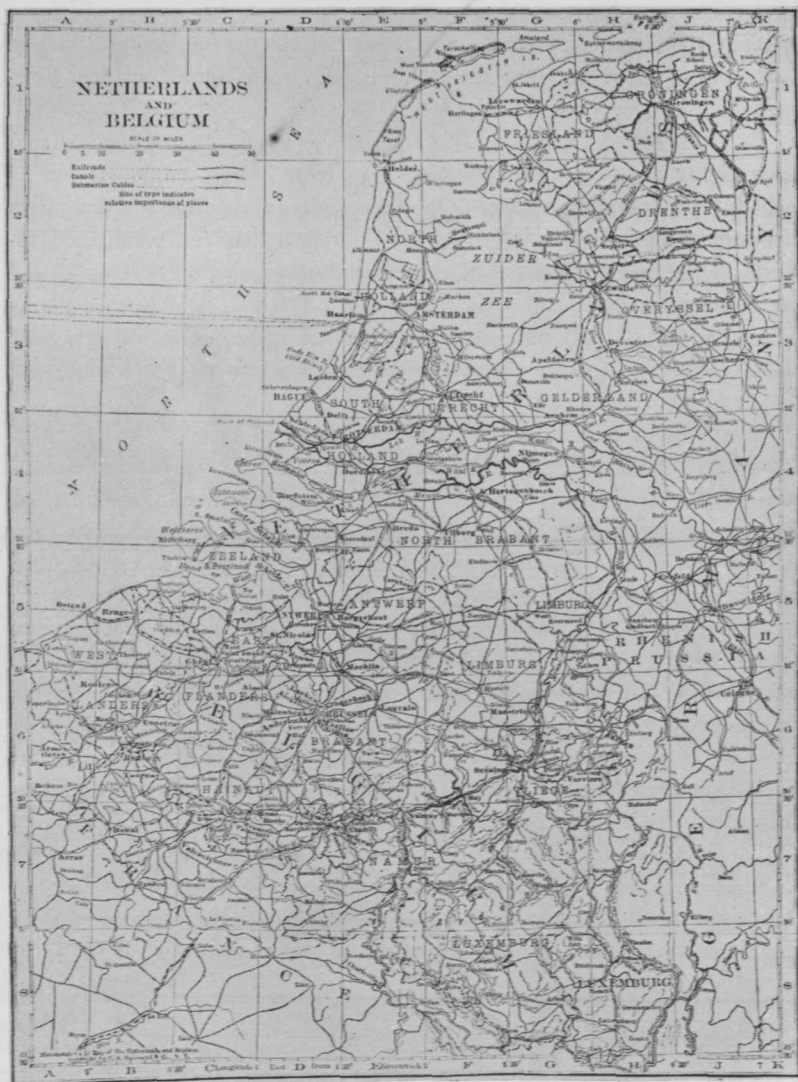
The Scheldt and the Meuse are the principal rivers. The Scheldt flows into the North Sea through Holland and is navigable for ocean-going traffic as far as Antwerp. Antwerp is the principal port of continental Europe. Ghent, Brussels, Ostend, and Zeebrugge are other important ports. Belgium has a splendid system of canals, and with her canals and navigable rivers has one mile of waterway to every 8.4 square miles of area. She has a very small merchant marine.

In 1815, by the Congress of Vienna, Belgium and Holland were united as an independent kingdom. In 1830 Belgium declared herself independent of Holland and set up a provisional government. Late in the same year the Conference of Powers, meeting in London, recognized the independence of Belgium. The next year Prince Leopold of Saxe-Coburg was placed on the Belgian throne.

The exact status of Belgium was not established until the Treaties of 1839 were signed in London. By these treaties Holland had the right to levy tolls on all ships using the Scheldt. The maintenance of the channel below Antwerp was placed in the hands of a joint commission.

The French had influenced the revolution in Belgium. France wanted to see Belgium independent or dependent upon her. England wanted to see Belgium any way in which she would not be subject to France. Prussia, Russia, and Austria wanted the United Kingdom of the Netherlands preserved. Prussia and Russia were too much concerned with the Polish revolution to bring any pressure to bear in the

matter. France wanted to act in agreement with England. Consequently, Belgium became an independent neutral state by agreement of all five powers.



During the Franco-Prussian War, violation of Belgium's neutrality by either France or Germany would have brought England in against the violator. Treaties to this effect were signed in 1870.

Up to the time of the World War, all nations professed to respect the neutrality of Belgium. In 1914 Germany violated this neutrality and England came to the aid of Belgium and France. France feared the participation of England against the aggressors in Belgium and stayed out until Germany made the first overture. Germany did not think that England would have time to do her any harm if she did come to Belgium's assistance.

At the Peace Conference of 1919 Belgium hoped to regain the West bank of the Scheldt and Dutch Limburg, which had in former years been Belgian territory. The Powers, however, admitted their inability to make any territorial changes in a neutral country and Belgium had to be satisfied with the 382 square miles of the German provinces of Moresnet, Eufen, and Malmédy. Another matter brought before the Peace Conference was the control of the Willingen channel, which is the exit from the Scheldt river and extends along the coast of Flanders beyond Malmédy. This question was not then and has not yet been settled.

A treaty with Holland regarding the upkeep and navigation of the Scheldt and the construction of a canal through Holland to the Rhine was rejected by the Dutch Senate in March, 1927. This puts the future of Antwerp as a port in a bad light.

Belgium is a constitutional monarchy under a constitution adopted in 1831 and slightly revised in 1894. Executive power is exercised by the king and his ministers. Legislative power is exercised by a popularly elected Chamber of Representatives and a Senate whose members are for the most part elected the same as the representatives. The king commands the Army and the Navy and has power to declare war and make treaties of peace, commerce, and alliance.

The principal political parties are the Catholic, Socialist, and Liberal, in order of strength. The cabinet formed in November, 1927, was composed principally of Catholics and Liberals.

The people of Belgium are not a homogeneous race. The western lowlands of Belgium are inhabited by Flemish or Dutch speaking people. The eastern half is inhabited by the Walloons, a French speaking people. The Flemish speaking population outnumber the French speaking population by nearly half a million. There is a great deal of friction between these two peoples, but they are held together by their dislike of the Dutch.

Belgium's density of population necessitates the importation of fifty per cent of her foodstuffs. Beet sugar is the only item exported in any quantity.

Belgium is essentially an industrial nation. The only mineral found in Belgium in any quantity is coal, but this is not sufficient for her manufacturing needs. She has large undeveloped copper resources in Belgian Congo. She imports large quantities of iron ore, zinc, coal, flax, hides, and cotton, and exports these same as manufactured products.

Belgium has trade agreements with Germany. Her manufactured products are largely the same as Germany's so she has little export trade with Germany. France must take manufactured products from Germany in payment of reparations and has raised the tariff on similar Belgian products. Consequently, France and Belgium can come to no trade agreement.

Belgium is now stable financially and is thriving.

Prior to the World War, Belgium never had an adequate army. Increase of her defensive strength had been consistently advocated by her rulers but the people hesitated at the expense and placed their confidence in the neutrality guarantees of 1839. The narrow escape from war in 1870 seemed to strengthen their confidence instead of arousing their suspicion. In 1913 Europe was in a state of unrest. It was apparent that in case of war between Germany and France, Germany would attack France through Belgium. This same year Belgium passed a compulsory service law. It provided for annual contingents of from thirty to forty thousand and was expected to product an armed force of 350,000 in event of war.

When the war broke in 1914 Belgium could muster less than 100,000 men. The largest number mobilized during the war was 267,000. The strength of the army in 1923 was 190,000; in 1925, 82,500; in 1926, 77,000; and in 1927, 62,000 officers and men. By a law passed December 22, 1927, the strength was set at 61,000.

Her military strength is approximately as follows:

	<i>Officers and Enlisted Men</i>		
	<i>Present Strength</i>	<i>Trained Reserves</i>	<i>Military Man-power</i>
Active Army _____	65,000	635,000	700,000
Territorial Army _____	_____	54,000	54,000
Gendarmerie _____	6,000	_____	6,000
Untrained man-power _____	_____	_____	315,000
	71,000	689,000	1,075,000

The army is divided into three Corps of two divisions each and various Army troops, including Air Service, Cavalry Corps, Artillery Brigade, and Tanks.

There are 16,000 native troops with white officers and noncommissioned officers, in the Belgian Congo. The native troops are not available for service outside of the colony.

The Regular Army is recruited by means of annual calls to the colors and by voluntary enlistments and re-enlistments. The duration of military obligation is twenty-five years, fifteen years in the Regular Army and Reserve and ten years in the Territorial Army. Service with the colors varies from ten to thirteen months.

The King is the Commander-in-Chief of the Army. His acts in time of peace must be countersigned by the Minister of National Defense. The Chief of Staff is the Minister's military adviser.

The country is divided into three territorial military areas corresponding to the three Army Corps. Each Corps in time of peace consists of two infantry divisions and one artillery regiment.

There is no seacoast artillery.

There are schools for all arms and services. There is a Military School at Brussels corresponding to our West Point. At Namur there is a preparatory school for prospective students of the military school.

Belgium has no navy, the former Belgian navy having been suppressed as a measure of economy.

Belgium's weakness consists chiefly in the absence of a natural defensive boundary. Towards the German frontier this condition has been slightly remedied by the inclusion in Belgium of the Eufen and Malmédy districts and much more so by the demilitarization of the Rhine Valley.

There is nothing in the political situation of Belgium which is likely to give rise to serious difficulties, either foreign or domestic. The difficulty with Holland on the Scheldt River and Wielingen Channel will probably be ironed out peaceably. The problems of economic and financial rehabilitation continue to overshadow all others.

MAXIM LI

It is the business of cavalry to follow up the victory, and to prevent the beaten enemy from rallying.—Napoleon's Maxims of War.

The Tacna-Arica Question

By CAPTAIN LEROY LUTES, C. A. C.

OUR military intelligence studies should cover all countries and all possible theaters of military operations but particularly should such studies follow closely the affairs of those countries most affected by the international policies or doctrines of the United States.

The Monroe Doctrine is first in importance among our declared international policies. In this doctrine, the United States declares her intention to guarantee to all republics of the Western Hemisphere protection from aggression or invasion by European powers. Representatives of the United States government, in conferences of the Pan-American Union and in various documents, have announced that it is also the intention of our government to assist by arbitration and if necessary by armed intervention in maintaining stabilized governments in all republics in the Western Hemisphere, in settling their international disputes, and in furthering their progress and welfare.

This is a "large order." It requires no flight of the imagination to believe that these policies may involve the use of our armed forces at any time. An example of this is our present participation in the political affairs of Nicaragua.

Not only may we expect situations to arise in our southern sister republics which may involve the use of our armed forces as military units, but, judging by past events, officers and enlisted men of our forces may expect to be detailed on administrative duties in such countries. It was on such duty in Cuba that the late Major General Leonard Wood attained an international reputation as one of the world's greatest Colonial Governors. In fact he was so rated by the British Foreign Office—which office has made a specialty of producing able Colonial Governors.

In performing his administrative duties in Cuba, Major General Wood utilized the services of many Army officers who thus received their first training on such duties. Among them was Lieutenant McCoy who recently as Brigadier General McCoy represented the President of the United States in assisting Nicaragua in her political difficulties.

I have touched on these matters as an introduction merely to emphasize that intelligence studies of this nature are well justified as part of our preparation for duties which some of us may be required

to perform in the support of the international doctrines or policies of our country.

The attempt of the United States to settle the Tacna-Arica question is a fairly recent example of the utilization of Army personnel for administrative work of the kind I have just outlined. Before touching on our participation in this matter, let us consider briefly the historical and geographical setting of Tacna-Arica.

Tacna-Arica is a territory bounded on the north by the Peruvian oil fields, on the south by the Chilean nitrate provinces of Iquique and Antofogasta, and on the east by Bolivia. Attention is invited to the fact that Bolivia has no outlet to the sea.

In 1880 Antofogasta was Bolivian; Iquique and Tacna-Arica were Peruvian. Chile, desiring to expand north, attempted to obtain concessions from Bolivia to operate the nitrate fields in Antofogasta. Bolivia, fearing Chilean expansion and desiring to retain her outlet to the sea declined to grant the concessions to Chile, and war resulted. Bolivia and Peru quickly formed an alliance, but Chile with her German-trained army and her British-trained navy was easily the victor within three months.

In the treaty of Ancon in 1883, which concluded this war, Chile gained the province of Antofogasta from Bolivia and the province of Iquique from Peru. By this treaty Chile also took over the control of Tacna-Arica for a period of ten years after which a plebiscite was to be held to determine whether the province should revert to the original owner, Peru, or remain with Chile. Tacna-Arica is of little commercial value. It has a large portion of desert country. The water supply flows through the old Inca graveyards and the country is full of dysentery. The soil has little nitrate or mineral wealth and is of small intrinsic value. However, Peru desires Tacna-Arica as a buffer to protect her oil fields from Chile while Chile desires Tacna-Arica as a buffer to protect her nitrate provinces. Herein really lies the value of the disputed territory.

When ten years had elapsed after the treaty of Ancon, Peru and Chile could not agree on the terms of the plebiscite. The Chileans insisted on having control of the polls and demanded that Chileans residing in Tacna-Arica be granted the right to vote. Peru would not accept either demand and contended that only the original residents of Tacna-Arica should be permitted to vote. The matter was offered for arbitration to the Pope and to the King of Spain in turn, but both wisely declined the offer. These discussions continued for twenty-seven years, at the end of which time Peru severed diplomatic relations with Chile.

At the end of the World War, Peru was an "associated power," and as soon as the Versailles Treaty was signed she disavowed the Ancon Treaty, citing as precedent the return to France of Alsace-Lorraine. Peru submitted the case to the League of Nations. Chile, not desiring to have the matter aired before the League of Nations, invited Peru to reconsider the question of a plebiscite as provided for originally in the Treaty of Ancon. Peru, in reply, suggested that the matter be arbitrated by the Government of the United States. The United States government during President Harding's administration, being in close touch with the case, quickly offered to arbitrate the question. Peru and Chile consented, and in May of 1922 both countries filed, through their representatives, their claims and counter claims.

The claim of Peru stated that Chile had violated the Treaty of Ancon by a systematic Chilenization of the Tacna-Arica territory, which result had been accomplished by boycotting Peruvian labor, and by assaulting, expelling and murdering Peruvian citizens who did not bend to the will of Chile. Peru further claimed that due to this violation of the Treaty of Ancon, Chile should no longer be entitled to govern Tacna-Arica or to participate in a plebiscite and that the province in question should be returned to Peru.

Chile, in turn, claimed that under the Treaty of Ancon she could govern Tacna-Arica as she saw fit and that, pursuant to the treaty, the plebiscite should be held. Thus we see another proof of the old adage, "possession is nine points of the law."

In March, 1925, during the administration of President Coolidge, the United States published the award. Secretary of State Hughes was the author of this award, which in brief, covered the following points:

1st, that the plebiscite should be held.

2nd, that during the plebiscite all power should remain in the hands of Chile.

3rd, that the plebiscite commission would consist of three members, an American, a Chilean, and a Peruvian, the American to act as President of the commission.

In addition, the award settled the question of the northern boundary of Tacna-Arica in favor of Peru.

The question of the southern boundary was remitted to the commission.

The award agitated prominent journalists on both sides of the question. Space does not permit me to quote any of these; however, in general, the Peruvian press accused the United States of favoring Chile, stating that Secretary of State Hughes had conformed to sug-

gestions of Chilean representatives and that the award assured Chilean success.

Chilean journalists appeared well satisfied with the award. However, Mr. Horace G. Knowles, former United States Minister, concurred in the views of the Peruvian journalists and added that Tacna-Arica was the Bunker Hill or Alsace-Lorraine of Peru; that it was here that Colonel Ugarte, Peruvian leader, rather than be captured by Chileans, mounted his horse and rode over Morro Cliff (three hundred feet high) and that for these and other reasons the soil of Tacna-Arica was sacred to Peruvians.

Chile received the award joyfully; the American Ambassador was cheered, church bells were rung, and patriotic parades were held.

In Peru the award was gloomily received. The President of Peru filed a formal protest, to the effect that Chile was importing Chilean voters into Tacna-Arica and also that Chile continued to persecute, imprison, and execute Peruvian nationals without trial.

In connection with this protest from Peru, it is interesting to note the remarks by Mr. William McGovern in his recent book, *Jungle Paths and Inca Ruins*, in which he tells of traveling south on a Peruvian boat, loaded with Peruvians en route to Tacna-Arica to vote. He states, "A surprisingly large number seemed able to prove that they were natives of the almost desert region. I could only conclude that this desert people must multiply like rabbits."

The President of the United States detailed General Pershing as the American member and president of the Tacna-Arica plebiscitary commission. General Pershing and his staff departed on the United States cruiser *Rochester* in July, 1925. On arrival in the port of Arica he was met promptly by a Chilean delegation with the Chilean plan. The General wisely suspended action on this plan until he could investigate the situation thoroughly.

As result of this investigation, General Pershing informed Chile that Peruvians must be granted equal rights with Chileans and a large number of Chilean troops withdrawn from the province before the plebiscite could be held. Chile protested to the President of the United States, stating that General Pershing was unnecessarily delaying the plebiscite. Chilean delegates temporarily absented themselves from sessions of the commission. General Pershing stated frankly that any delay was due to obstructions Chile had placed in the path of a fair and free election. Needless to mention, President Coolidge supported General Pershing and Chile finally agreed to proceed.

General Pershing, with the approval of the Plebiscite Commission, named January 15, 1926, as the date for presentation of the election

law. The registration was to be held from February 15 to March 15, 1926, and the final votes were to be cast on April 15, 1926; however, General Pershing became ill and returned to the United States before he could take further definite action on the case.

Major General Lassiter, then on duty in the Panama Canal Department, was detailed to replace General Pershing. General Lassiter selected twenty Army officers and certain enlisted personnel from the forces in the Panama Canal Zone to assist in the registration and election throughout Tacna-Arica. His plan was to have each registration and election board composed as follows: one United States Army officer as member and President of the board, one sergeant of the United States Army as Secretary, one sergeant of the Porto Rico regiment of Infantry as Sergeant-at-Arms, and the Chilean and Peruvian members.

When the officers and enlisted men arrived in Tacna-Arica, a school of instruction was established for them under the direction of Colonel Kreger of our Judge Advocate General's Department. After one month's instruction these officers and enlisted men were sent out to their respective boards. Some were detailed to remote villages sixteen hours by horseback across the desert.

Each member of these boards (from our services) was also a member of Major General Lassiter's intelligence service, and each was required to render reports on all matters of importance affecting the plebiscite.

As was expected, the Chileans attempted to control the votes during the registration by registering all Chileans and by suppressing the Peruvians. This brought forth protests from the Peruvians and in many places riots and demonstrations occurred.

As a result of reports submitted by his intelligence service Major General Lassiter became convinced that a fair plebiscite could not be held under the circumstances. He did not arrive at this conclusion until he had made a complete investigation of the matter and had made repeated efforts to get Chile to correct conditions.

The results of Major General Lassiter's investigations were fully covered in an address he made before the Plebiscite Commission and in his final report. Space will not permit me to quote the address and the report. Both were comprehensive and cover the causes of the failure of the Plebiscite in detail. In both, Major General Lassiter outlined the state of conditions fostered by the Chilean officials in Tacna-Arica, citing a long list of specific examples. In closing his address Major General Lassiter stated in part as follows:

"The inescapable conclusions must be arrived at, that the Peruvian electorate has been physically reduced below its proper figure. . . .

"It is hardly necessary for me to reiterate the deep regret which I feel in being obliged to conclude that the plebiscitary proceedings which were conceived in such high hope and aspiration, begun with zeal and energy, and carried on with care and labor through many months, must now be abandoned."

I have tried to outline, not only a brief history of the Tacna-Arica question but also the methods used by our military personnel in attempting to settle the question and some indication of the difficulties encountered in performing such duties.

Conclusions which I believe may be obtained from this study are as follows:

1st, That the Tacna-Arica question is not settled and promises to cause future trouble.

2nd, That a fair plebiscite cannot be held in Tacna-Arica unless the territory is neutralized by United States troops.

3rd, That the second conclusion may be applied to the majority of cases of this kind involving international questions in countries affected by the Monroe Doctrine. This is a point worth remembering should we, at any time, be ordered to perform duties similar to those outlined in this paper.

MAXIM LXXVIII

Peruse again and again the campaigns of Alexander, Hannibal, Cæsar,, Gustavus Adolphus, Turenne, Eugene, and Frederick. Model yourself upon them. This is the only means of becoming a great captain, and of acquiring the secret of the art of war. Your own genius will be enlightened and improved by this study, and you will learn to reject all maxims foreign to the principles of these great commanders.—Napoleon's Maxims of War.

Unit Mobilization Plans

By 1ST LIEUT. P. B. KELLY, C. A. C.

EDITOR'S NOTE: *So far as the JOURNAL is informed, no forms for mobilization plans have been prescribed by any headquarters higher than those of Corps Areas. Where forms are prescribed they must, of course, be followed. Where no form is prescribed, that suggested by the author may serve. In any case it offers helpful suggestions toward completing whatever form may be used.*

PERHAPS the most important outgrowth of the World War experience, certainly the most important from a far-sighted military viewpoint, is a realization on the part of statesmen and soldiers alike that an adequate and efficient system must be worked out for the mobilization of the military manpower of the nation to meet a national emergency. The broad policies governing such a system of mobilization are laid down in the National Defense Act of 1920. These policies, insofar as they affect the Army of the United States, are made effective by the War Department General Mobilization Plan, and this plan, in turn, is elaborated and put in workable form by the various Branch and Corps Area Mobilization Plans. Finally, the commanders and staff of each fighting unit and military installation are required to draw up unit mobilization plans providing for the expansion, organization, and training of their respective units in the event of a national emergency. In the following brief discussion I shall attempt to present an outline of the purpose, content, and form of the Unit Mobilization Plans.

In general, it may be said that the purpose of a Unit Mobilization Plan is to provide a guide and schedule for the transformation of a certain body of individuals into an efficient military unit, and further to provide for the smooth and well-timed dovetailing of this unit into its place in the pattern of a higher unit. The unit plan is concerned chiefly with the formation of a fighting machine, but it must be drawn up in such a way as to conform and coordinate with the plans of higher units and must, in addition, be so constructed in each case as to fit local conditions and meet the requirements of the local situation.

Now, in order to present a general picture of mobilization and to emphasize the need for mobilization plans, I would like to draw a broad analogy between the building of an army and the building of any other large structure. The *work* on a large construction job starts at the bottom, in the foundation, and rises step by step into the completed building. It is exactly so with an army. Batteries must be

organized in order to form regiments—regiments must be organized in order to form brigades and divisions—and so on. However, the plans for the construction of a building grow out of a general conception or picture in the mind of the architect. This conception forms the basis for a set of master plans which are used as a guide in the drawing up of plans for the large divisions of the work. And so on down, each contractor and sub-contractor basing his estimates and plan upon specifications that are handed him from above. Again we have the analogy to the building of an army. The various plans for building, or mobilizing, the units of an army must be predicated in each case upon the plan of the next higher echelon. The army grows upward from its smallest units; the plan for that growth comes down, step by step, from the top. With this in mind we can say that the prime requisites for a unit mobilization plan are, first, that the plan make all possible provisions for whipping the unit into shape as an efficient military machine in the shortest possible time, and, second, that the plan conform and coordinate with the plan of the next higher unit. The first requirement is the real purpose of the plan, the second requirement simply imposes certain limitations upon the first.

Now let us turn to the Army Regulations. A. R. 120-10 states in part: "Mobilization for national defense is the operation of assembling and preparing the man-power and resources of the country to meet war conditions." And in regards to the "Man-power" clause, it goes on to say, "It includes all the processes required to convert trained, partly trained, and untrained individuals into units organized and prepared for military employment. These processes are:

1. The procuring, classifying, equipping, and assigning of individuals.
2. The organizing, equipping, supplying, and training of units.
3. The movements incidental to assembling individuals into units.
4. The movement of units to a theater of operations or other place of active duty."

Neglecting for the moment all problems of troop movement, we find that the procuring, equipping, organizing, and training of units depend upon three conditions:

1. The recruitment rate.
2. The organization and training rate.
3. The supply rate.

And of these the supply rate may be expected to be the controlling factor. The unit commander engaged in the business of drawing up his mobilization plan may very well ask himself these questions:

"How am I to get men to bring my organization up to war strength?" "How shall I fit these men into my organization and bring the whole outfit up to maximum efficiency in a minimum time?" and "How am I to feed, equip, supply, pay, hospitalize, and train my unit during all the stages of its formation?" The measure of success of the working of his plan will depend upon the amount of care and foresight he puts into his prepared outline for the solution of these problems.

So much for generalities. Now let us consider the detailed construction of a unit mobilization plan. The following self-explanatory form is *one* convenient set up for such a plan:

FORM FOR UNIT MOBILIZATION PLANS

(This form is a suggestion only and was prepared primarily for unit plans for companies or analogous units. The plans of higher units could follow the same sequence but must be prepared in such a manner that they may be used by the lower units as directives and will contain all the data necessary for the lower units properly to cover mobilization in their plans.)

FORM UNIT PLAN for the GENERAL MOBILIZATION of

(Name of Organization, Brigade, Division, RA, NG or OR, Home Station.)
(If part of Corps, Army, GHQ, Communications Zone or Zone of the Interiors Troops indicate.)

(Name of Commanding Officer) (Rank, Branch of Service, RA, NG, or OR)

(Address of Commanding Officer)

This Unit Plan will be located in the (*indicate where filed*) at all times.

1. MOBILIZATION PROCEDURE:

a. Mobilization Period M _____ to M plus _____ months.

(Note: The above refers to the total period utilized in mobilization of the unit at the mobilization concentration camp or area as well as the period at the local mobilization point. "M" referred to is the War Department M-Day and must not be confused with the day a unit commences mobilizing since this day may be any day up to M plus 12 months. All units should calculate their mobilization period using the War Department M-Day as a basis. This information should be furnished units by data contained in the mobilization plans of the next higher unit.)

- b. This unit will assemble at.....
(State place).
- c. This unit will proceed to.....
(State mobilization camp or area)
on M plus.....days or months.
(Give number of days or months)
- Note: This information should be furnished units by data contained in the mobilization plan of the next higher unit.
- d. This unit will be available for the Theater of Operations or other duty on M plus.....days or months.
(Give number)

2. GENERAL SCHEME OF MOBILIZATION: Give here a brief outline of the general scheme of mobilization of the next higher unit taken from the mobilization plan thereof.

3. MISSION: To mobilize the.....beginning on
(Name of Unit)
..... The mission includes the procuring, assembling, organizing, training, sheltering, equipping, and supplying the personnel of this unit in preparation for active operations.

4. DECISION: To mobilize the.....using the methods
(Name of Unit)
and plans as set forth herein.

5. This plan consists of: (Give here a list of the documents which will form a part of the unit plan such as Appendices, Annexes, lists of requirements, maps, Table or Organization, and any others which are to be attached.)

6. PROCUREMENT OF PERSONNEL:

a. Officers: (State how the officers for the unit are procured and assigned to the unit to obtain war strength.)

b. Enlisted Personnel:

(1) Voluntary enlistment or draft. (Note: If procured by voluntary enlistment, state territory from which your local recruiting force will obtain them. State in detail the composition of the recruiting force which you are to utilize and how it is to operate. State when voluntary enlistments begin for your organization and when they cease. State how you are to obtain the remainder of the enlisted personnel to bring your unit to war strength. In cases where the unit is at present inactive, state from what unit the cadre is to be obtained and how the unit is brought to war strength.)

(2). Specialists: If specialists are required after the voluntary enlistments have ceased or the draft quotas have reported, state how they will be obtained. Attach a list enumerating the class and number of specialists required at the present time. This list should be kept up to date by changes when new specialists are obtained and should be used as a basis for submitting requisitions for additional specialists as necessary. State method of submitting this

requisition for additional specialists and through whom submitted.

(3). Strength: Indicate by a table attached to the plan the strength that should be present in the unit at the end of each month of the mobilization period. This data will be furnished through the mobilization plan of the next higher unit or by a letter of instructions to units not part of a higher unit.

7. ASSEMBLING:

a. State the exact words that will be used in the order that will be sent to warn the members of the unit to prepare to mobilize. State the exact words that will be used in the order to mobilize the units (assembling at the designated place). State methods that will be utilized in transmitting the above orders to the members of the unit. Give a list of the places where the notice that the unit will mobilize is to be posted. Keep up to date a list of the names and addresses of members of the unit. Do not send this list forward but keep it on file with the retained copy of the unit plan.

b. State the time necessary for the unit to be completely assembled at the designated rendezvous (assembly place).

8. ORGANIZATION:

a. State the number of the Table of Organization used for the organization of your unit. Attach a copy of the unit plan.

b. State briefly how the unit will function prior to obtaining war strength.

9. SUBSISTING:

a. State the method that will be used in subsisting the personnel at local mobilization points: Give names of the eating places. For Regular Army units this is not necessary, only a statement that a mess will continue as in peace time. National Guard and Organized Reserve units will be on a per diem or meal contract basis while at local mobilization points.

b. State arrangements for messing while in mobilization concentration camps or areas; state how equipment and supplies are procured and where delivered.

10. SHELTER AND STORAGE:

a. Arrangements for shelter during local mobilization period.

State method of housing the personnel of the unit. State whether or not some or all of the members of the unit can use their own homes. State what arrangements have been made for housing personnel in the vicinity of the drill grounds. Attach a list of the lodging houses showing the number accommodated by each and the price per person per day at each.

b. Arrangements for shelter in mobilization camps or areas and installations:

(1) State character of shelter including that for storage space and utilities; how obtained, whether by hire, lease, or contract; private, U. S. Government, or State; and capacity.

(2) State any requirement in new construction.

11. TRAINING:

a. Give in detail the training schedule to be used during mobilization, covering a period of not less than 12 weeks. This should cover each

subject, giving the number of hours to be devoted to each and the sequence of subjects.

b. State location of training ground and target range if any available. State method of obtaining the use thereof whether by lease, hire, or contract and whether private, U. S. Government, or State.

12. SANITATION:

a. State plans for the sanitation of the places for shelter, subsistence, training, and any other place utilized by the unit for personnel or property. State who will be responsible therefor, number of inspections required daily, method of care and handling of food. State any other points covering the matter of sanitation.

13. MEDICAL SERVICE:

a. State plans for medical officers to conduct the required physical examinations, inoculations, vaccinations, and other medical attention. If no medical officer is in the vicinity and none has been designated to cover the operations of the above, state name of local physician who will be selected for these duties. (See paragraphs 33 and 24, Army Regulations 130-10.)

14. HOSPITALIZATION:

a. State name of nearest military general or station hospital where those requiring hospitalization will be sent. In case no hospital in the above category is in the vicinity, state the name of the nearest civilian hospital that will be used.

15. CLOTHING AND EQUIPMENT:

a. Attach a list of clothing and equipment that will be required during the period that the unit is at its local mobilization point, state from where it is obtained and state where any surplus clothing or equipments will be turned in prior to leaving the local mobilization point.

b. Same as paragraph *a* above for the unit while at the mobilization concentration camp or area.

Study the mobilization plan of the next higher unit and any letters of instructions received from higher headquarters before writing up the two paragraphs above.

16. TRANSPORTATION:

a. State method of transporting personnel and supplies; if no government transportation is available, state how transportation will be obtained. Give name of party from whom obtained, the amount of transportation required, and the price of same.

b. State method of transportation of the unit to the mobilization concentration camp or area. If railroad transportation will be required, indicate number of cars required; if motor transportation, indicate number and type of trucks required.

17. COMMUNICATIONS:

a. State methods that will be utilized in communicating to higher and lower units within the same organization.

18. FINANCE:

a. State method of reimbursement to civilians for services rendered and indicate who will be responsible for contracts, disbursements, and other financial transactions pertaining to the unit.

19. RECORDS:

a. List all reports required. State who will be custodian of all records and where filed. Indicate where the command post of the unit will be located while at the local mobilization point and while at the mobilization concentration camp or area.

20. TEST MOBILIZATION:

a. Indicate what reports are required and what the plans are in case a Test Mobilization of the unit is ordered.

(Signature of Unit Commander)

A Unit Plan based on the above form would probably contain all the necessary provisions for the mobilization of the unit, but it would be dangerous to prescribe such a form for *all* units of an army. Size of units, branch of service, geographical location, and various local conditions might make another form of plan desirable. In general, however, there should be uniformity of plan within large units, and a sound general plan may be easily adapted to meet special situations.

In conclusion it seems wise to repeat and emphasize the aim of a unit mobilization plan.

It should provide for the building of an efficient military machine that will slide smoothly into its place in a larger machine.

It should provide in general for the recruitment, supply, organization, transportation, and training of the unit for war.

It should reduce the time for mobilization to a minimum and use as much of this minimum time as is possible in TRAINING.

Mobilization is not an object in itself; it is a necessary evil. Organized defense and a successful offensive both must wait on mobilization. Mobilization plans cut down the dead time of mobilization and add force to the quick blow that usually gives success. The ultimate object of mobilization plans is very well expressed in the words of an old Civil War guerilla leader whose single, simple axiom of war was, "*Git thar fustest with the mostest men!*"

MAXIM LVII

When a nation is without establishments and a military system, it is very difficult to organize an army.—Napoleon's Maxims of War.

EDITORIAL

Battle Practice

ON page seventy of the COAST ARTILLERY JOURNAL of July, 1928, appears the statement: "It has been over ten years since we have had an opportunity to hold such practices (battle practices), and their revival is particularly gratifying . . ." Standing thus unqualified, the statement does not say exactly what it means, and exception is very justly taken to it. During the period in question, battle practice was not a prescribed procedure in our annual training program, and there were many officers, particularly within continental United States, who had never witnessed such a practice. However, sight had not been lost of the benefits to be derived from combined practices, and in certain instances, especially in some of our overseas garrisons, energetic commanders had held battle practices. The JOURNAL considers it as probable that these instances, indicative of a full appreciation on the part of the commanders concerned of the need for battle practice and combined training in the development of coast artillery tactics and in the taining of the coast artillery personnel, had much to do with the restoration of battle practice as a prescribed feature.

PROFESSIONAL NOTES

Coat of Arms of the Harbor Defenses of the Potomac

Shield: Gules, two bars, *argent*, in chief three mullets of the like.

Crest: On a wreath of the colors an eagle's head erased *sabled*, armed *or*.

Motto: *Exitus acta probat.*

The shield in this case is the same as in the coat of arms of the Washington family, with colors reversed. The crest is taken from the arms of the Digges family, the original owners of the land on which Fort Washington is now located.

An Improved Machine-Gun and Pistol Target Support

CAPTAIN G. B. ROBISON, 61ST C. A.

In the spring of 1927 it was necessary to reconstruct the target supports on the 1,000-inch range of the machine-gun battery of the 61st Coast Artillery. The



FIG. 1

old framework was knocked off, the old uprights were removed, and the reconstruction was completed after several days of tedious work by a squad of men.

The man-hours expended seemed justified as it was believed that little further attention would be needed for years to come.

Several months later came the first of the season's pistol practices held on this same range. Since the machine-gun target is approximately six feet wide and four feet high, while the pistol target is the reverse, that is, four feet wide and six feet high, it is obvious that the pistol targets overlapped the uprights which had been spaced for machine-gun targets.

The net result of this was that by the spring of 1928, the 8"x12"x10' uprights had been shot to pieces by pistol bullets and the battery charged with the

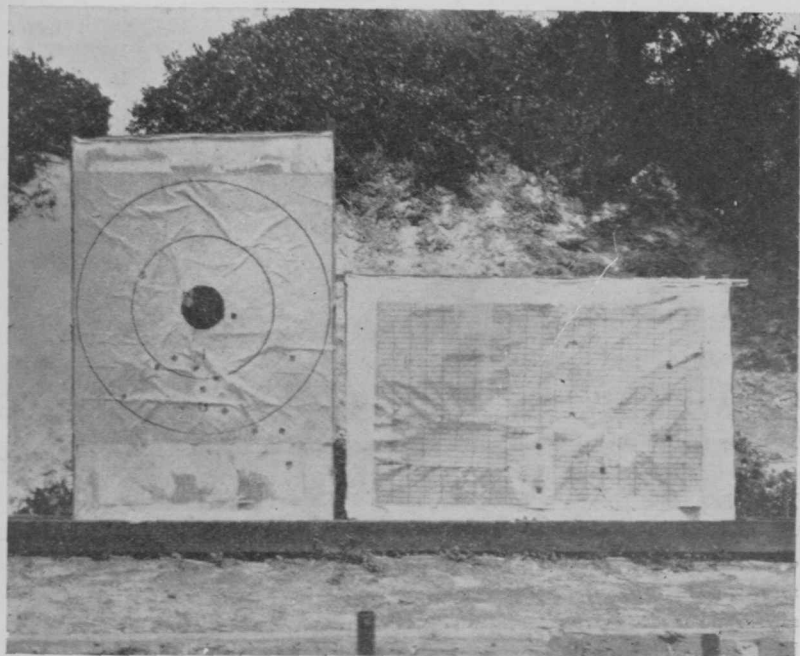


FIG. 2

maintenance of this range was faced with the necessity of its entire renewal within a year of its completion.

The most obvious solution of the difficulty was to place the uprights twelve feet apart to take two machine gun and three pistol targets without overlap from either. It seemed however that the uprights could be eliminated entirely. They were sawed off on a level line, close to the ground. Four by eights were placed over these supports and spiked to them. Four by fours were placed on the back edge and firmly fastened. Two by sixes were nailed at the front edge. Spacing blocks were placed every twelve feet. This left a trough in which the targets fit securely. A further idea of the construction may be obtained from Figure 1.

Figure 2 shows the appearance of both sorts of target in the trough as viewed from the front.

This type of construction has the following merits. 1. The original installation is comparatively simple. 2. Only occasional wild shots can strike the small exposed area, and these do practically no damage. 3. Targets may be set up and taken down in a fraction of the time previously required. 4. A neater general effect is produced.

No trouble has been experienced from winds or any other cause. As will be observed in Figure 2, the targets are backed by a sand bank which acts also as a wind break. When the back stop consists merely of a water area or when heavy winds may be expected on the faces of the targets, it is recommended that the depth of the trough be increased.

Firing by High Burst Ranging, Two Methods or One?

In the April 1928 number of the *Revue d'Artillerie* appears an excellent discussion of the subject of high burst ranging by Captain E. Brock, of the French Artillery. While the subject is not one that is being much discussed by the Coast Artillerymen, the following excerpts should prove interesting to most of us. The tables and formulas contained in the article together with a pamphlet, *Flash, Sound, and High Burst Ranging*, which contains a detailed description of both the Tangent Reticule and the Telemetric methods, can be obtained from the COAST ARTILLERY JOURNAL.

Two methods are actually admissible for High Burst Ranging fire:

1. The tangent reticule method.
2. The telemetric method of the geographical service, called the method of Major Hurault in an article of the *Revue d'Artillerie* for September, 1927.

The first method is known to all artillerymen.

The second method has recently been explained in the *Revue d'Artillerie*. It can be summarized as follows:

A computing section belonging to the range-finding section working on the observations made by the aid of very accurate instruments, determines, by three solutions of triangles, the coordinates x , y , z of the mean point of burst of a series of time-fuzed rounds fired by the battery. From these coordinates, the battery commander seeks, in the horizontal plane of the piece, the fictitious center of impact of the trajectory corresponding to the angle used in the high burst series; then he transfers, by a very simple method, this fictitious centre of impact to the target.

The transfer from the mean point of burst to the fictitious point of impact is accomplished by means of the formula for the fall of the trajectory:

$$U = h \cot gC(1 + \frac{1}{3} \frac{h}{F}) \quad (\text{Colonel Dufren is}) \text{ in which:}$$

U and C have the same values as in the tangent reticule method,
 h is the difference of altitude between the mean point of burst and the battery,
 F is the maximum ordinate read in the firing table opposite the quadrant angle used.

If the graph of the end of the trajectory is prepared, the calculation of U may be omitted.

But these graphs are hard to manage, relatively few in distribution, and their use frequently gives cause for errors.

Aside from their actual form of operation, the two methods can be compared as follows:

Using the same instruments, they are conducted in precisely the same manner up to the fire-for-effect stage.

The telemetric method is the simpler; the preparation of fire is *immediate*, since the battery commander need only produce time-fuze bursts in the vicinity of the point that he has indicated to the telemetric section. But the use of observations relating to this time-fuze series is accomplished in two steps, by the computing section and the battery commander; the operations of both are complicated enough, those of the computing section however being always greatly abbreviated by the use of special scales.

The tangent reticule method is relatively complicated; the preparation of the adjustment (the operations necessary to put the center of impact on the target) is long and necessitates the establishment of a computing scale and a graph, the setting up of which, following the firings, requires from one to two hours.

From the point of view of the employment of these methods:

a. It takes in general, for the telemetric method, from 20 to 25 minutes between the ending of the high burst ranging and the beginning of the fire for effect.

b. On the other hand, with the tangent reticule method, this interval of time is about 10 or 12 minutes.

If, during the course of fire for effect of long duration, it is desired to verify the data deduced from the time-fuze adjustment which was used in the beginning, or even if it is a question of resumption of fire:

a. The telemetric method is complicated; it is necessary to repeat in these two cases the same operations as in the first adjustment.

b. The tangent reticule method is extremely simple; the data given to the gun pointer are always the same and the chart is always ready.

If it is desired to calibrate the four pieces of the same battery:

a. The telemetric method is complicated: it is necessary to repeat for the second, third, and fourth pieces the same operations as for the first.

b. Making the assumption that the observation angles do not change when passing from the first to the fourth piece, the tangent reticule method always remains simple; the sights are not altered and the same chart serves for the four pieces.

Finally, if only the technical side of the question is considered, since it is necessary to begin over again for each point by means of the time fuze all the series of operations of the first adjustment, which might be accomplished by the same piece (in the control of the fire for effect, resumption of fire) or by the different pieces (fire for calibration), that fact prevents the substitution of the telemetric method in its present form for the tangent reticule method.

The purpose of the present study is:

1. To discover if it is possible to speed up the telemetric method in the conduct of fire for effect and the resumption of fire.

2. Profiting from the results obtained, to simplify the two methods themselves and in particular, to reduce for both the dead time between the adjustment fire and the fire for effect.

3. To make possible and rapid the calibration of the four pieces of a battery by the telemetric method.

Here the article continues with chapters, under the following headings, which contain principally tables and formulas for the simplification of the two methods.

I.

The Use of the Telemetric Method in the Conduct of Fire for Effect and the Resumption of Fire.

* * *

II.

The Two Methods of High Burst Ranging Can be Made More Simple and Rapid.

* * *

III.

The Use of the Telemetric Method in Calibrating the Four Pieces of a Battery.

* * *

In conclusion the author states that:

"Thus, by means of some modifications due to the experiment more in detail than given in the firing table or by means of the use of a table—easy to figure—when the firing tables no longer furnish sufficiently accurate data, the telemetric method can perhaps be used in cases where formerly it would have been replaced by the tangent reticule method:

Conduct of fire for effect, adjustment by high burst ranging.

Resumption of fire adjusted previously by high burst ranging.

Calibration of the guns of the battery.

Further, by means of the method proposed, it is possible to reduce in a very appreciable proportion the interval of time which separates the fire for effect and the adjustment fire in applying this method.

The method becomes for the battery commander—who seldom works difficult problems in battle under conditions of comfort and freedom of thought—an easy method and extremely simple in all cases.

Finally, if while using it, our rules for firing contain the question of high burst ranging for several batteries the telemetric method, assisted by the method of operation described for calibration firing, may be used without doubt to furnish a good solution of the problem.

Is not the logical conclusion of all that has preceded, the substitution pure and simple of the telemetric method, thus transformed, to the tangent reticule method?

It does not seem so.

From the tactical point of view, it is very necessary to be able to concentrate or spread out according to conditions. The telemetric method corresponds for the larger part of the artillery, to the concentrating of the rules for adjustment to the regimental echelon; the tangent reticule method, on the contrary decentralizes them as far as the group echelon. There is need then to keep both methods.

From the technical point of view, the tangent reticule method always keeps its theoretical advantages of being able to eliminate the errors due to dispersion

of the fuzes along the trajectory, in as much as it makes of fuze firing a fictitious percussion firing on the reference plane.

The suggested methods of operation further increase the rapidity of the tangent reticule method.

Finally, if the operations of the battery commander are simple in certain cases, even simpler in others, after an adjustment by the telemetric method thus modified and after an adjustment by the tangent reticule method, there does not remain less than the telemetric method required of the computing section for the data, which, although rendered more rapid by the use of the special rules of calculation are even then complicated.

In the normal case of an adjustment by high burst ranging:

The telemetric method will not require as much calculation preparation, but the fire for effect cannot begin for about ten or fifteen minutes after the adjustment fire, in spite of the proposed improvements.

The tangent reticule method will require a preparation of from one and one-half to two hours (computation of scales, graphs, sight settings) but the fire for effect will open up five or six minutes after the adjustment fire.

The mission entrusted to the artilleryman will dictate the choice between the two methods."—J. L. W.

Restudy Our Military Policy

When the national defense act was passed seven years ago it was believed to be a great advance in preparedness. It was, at any rate, a formulation of military policy, and it was hoped that henceforth our military defense would escape from the waste and inefficiency of piecemeal legislation and evolve consistently and comprehensively on scientific lines.

But the possession of a military policy and system does not settle our defense problem, though a good many in and out of the army may assume it does. On the contrary, it is only too likely to become an obstacle to growth and an encouragement of unfounded self-confidence. Whatever policy and system we have should be at all times subject to study, criticism, and amendment, perhaps to drastic alteration. Self-interest and bureaucratic inertia will always resent criticism and resist change, but if the national defense is not to be a deception it must be open, as our science and industry and business are open, to the influence and forces insuring growth.

The *Tribune* believes it is now time to restudy our military policy and subject the national defense act to a thoroughgoing examination in the light of modern experience. The measure was formulated so soon after the European war that neither the generals nor the general staff, much less the lay public, had had time to digest the lessons of the war. The system we have set up is an imitation of the German. It represents chiefly the ideas held by European military leadership before the war rather than ideas brought forth or at least corrected by the experiences of the war. It is not, therefore, a real advance but a reversion. The conditions and policies of our military organization, as more or less improvised upon European practice during the war, were such as to shut off the staff and higher command from the experiences of actual combat and the influence of those

who were gaining it at the front, and the censorship of news and suppression or discouragement of criticism prevented the dissemination of military knowledge.

There is, therefore, we believe, no proper realization even among professional soldiers of the errors of pre-war military theory and practice. The blunders and fallacies of the war generalship have not yet been fairly faced and exploited. But since the passage of the national defense act a great deal has been disclosed, and meantime we are now in a position to know many of the shortcomings of that measure. We ought to restudy it and try to evolve something much better, making use of the actual lessons of the war and giving the most thorough and hospitable consideration to new ideas. The present system is likely to fix us in outworn doctrines and methods, and will reduce the army of the future to a civil service bureaucracy obstructive to progress and incapable of victory.—*Chicago Tribune*.

Patriotism In the Schoolroom

The glory of peace, rather than the glory of war, should be taught in the public schools, Dr. Daniel L. Marsh, President of Boston University, tells the National Education Association at its Minneapolis convention.

Constructive patriotism, he believes, would forego the idolization of martial heroes and stress the greatness of statesmen who intelligently lead nations over the quicksands of progress without involving them in wars. So far, so good. That war is a terrible thing, to be avoided by every honorable means, is something that should be taught in the schools. For that matter, it is already being taught.

But let no citizen forget that the United States was once a feeble group of coastal settlements, that the United States today is the world's most prosperous and potentially most powerful nation, and that this amazing metamorphosis was achieved largely because genuine patriotism has been taught for a century and a half in the American schoolroom.

"Military music," says Dr. Marsh, "is sweet as hell, because it makes us love the things we hate."

Military music is sweet, because it makes us love the things we should love. Exceptional, indeed, is the man, the woman or the child who does not thrill to the music of the band playing *The Stars and Stripes Forever*, as the Flag goes by.

This is as it should be, and for this the Nation owes to a dozen generations of American school teachers an incalculable debt. Every war in which this Country has been engaged since it first set up its own Government, has been won in the schoolroom, from ten to fifty years before the first gun was fired. Patriotic teaching in the first half of the Nineteenth Century saved the Union when the crisis came. Indeed, the view is reasonable that, if more of national patriotism, as contrasted with local patriotism, had been taught in the ante-bellum schools of eleven Southern States, there never would have been any Civil War.

Old World tyranny has gone from the Western Hemisphere today, because, in the three or four decades following the Civil War, children in the public schools were taught that to honor the Flag, and to bear arms in defense of the Flag, were sacred obligations of American citizenship. Instead of sawing wood

at Doorn today, the former Kaiser would be dictating to the world from Potsdam, had not American school teachers, twenty, thirty and forty years ago, been teaching their pupils that patriotism was something to be served with deeds as well as words.

Let us teach American school children that war's horrors far exceed war's glories, that international violence is a folly to be avoided by every honorable means, that the statesman who leads the Nation upward without resort to war is greater than he who plunges the Nation into an avoidable war. Let us teach American school children to beware of the jingo who preaches war for war's sake. Let us have no saber-clanking and no goose stepping.

But let us also continue to teach American school children to beware of the pacifist who preaches nonresistance to aggression, who professes to see an insurance of peace in foolish unpreparedness, and who paints military service as something to be ashamed of.

The American Flag is the greatest flag in the world today, not so much because of wise statesmanship at Washington, as because of intelligent teaching of genuine patriotism by the men and women in charge of American schoolrooms.—*Minneapolis Journal*.

MAXIM LVI

A good general, a well-organized system, good instructions, and severe discipline, aided by effective establishments, will always make good troops, independently of the cause for which they fight.

At the same time, a love of country, a spirit of enthusiasm, a sense of national honor, and fanaticism will operate upon young soldiers with advantage.—Napoleon's Maxims of War.

COAST ARTILLERY BOARD NOTES

Communications relating to the development or improvement in methods or materiel for the Coast Artillery will be welcome from any member of the Corps or of the Service at large. These communications, with models or drawings of devices proposed, may be sent direct to the Coast Artillery Board, Fort Monroe, Virginia, and will receive careful consideration. W. E. COLX, Colonel, Coast Artillery Corps, President, Coast Artillery Board.

Project No. 633, 75-mm. Subcaliber Mount T2 for 16-inch Howitzer Carriage, Model 1920.—A design of a proposed subcaliber mounting was submitted to the Coast Artillery Board for study. The design is believed to be satisfactory, and it was recommended that a model be constructed for test.

Project No. 634, "Jackson" Antiaircraft Spotting (Camera) Unit.—Captain A. M. Jackson, Coast Artillery Corps, Submitted a description of the construction and operation of the spotting camera for antiaircraft fire, designed by him. The Board is of the opinion that the text is in satisfactory form for publication.

Project No. 635, "Hohenthal" Method of Antiaircraft Adjustment of Fire.—The Coast Artillery Board has studied the method of adjustment of antiaircraft fire as proposed by Captain W. D. Hohenthal, 63d Coast Artillery (AA), and has recommended the publication of this method in the COAST ARTILLERY JOURNAL. The Board also recommended that the charts prescribed for this method be used during the tests to be conducted at Aberdeen Proving Ground during the fall of 1928.

Project No. 636, Ear Protection for Antiaircraft Gun Crews.—The Concussion caused by discharge of 3-inch Antiaircraft Guns on the new model trailer mount results in severe pain to members of gun crews, and frequently incapacitates them. A study was made of means of overcoming this undesirable feature. The Board recommended that the duralumin platform be slotted; *i. e.*, constructed in the form of a grating.

Project No. 637, Timbers for Shell Storage for 240-mm. Howitzer Materiel.—The question was presented as to whether these timbers should be made an article of issue. As these timbers are not used in peacetime, and as they would be improvised in wartime, the Board recommended that they be not prescribed as an article of issue.

Project No. 638, Test of Proposed Kitchen Car for Railway Artillery.—This project is a continuation of studies begun under Project No. 587. A wooden box car was converted into a kitchen car and tested during the recent battle practice at Fort Story. As a result of these tests, the Board has been able to arrive at definite conclusions. Recommendations covering this type of equipment are incorporated in the report of the Board on this project.

Project No. 639, Training Device for Stereoscopic Observers.—A translation of a French document describing a device for training stereoscopic observers was submitted to the Board. This device appears to accomplish for stereoscopic observers what the Makaroff Trainer does for coincidence observers. It was the opinion of the Coast Artillery Board that such a device would be very desirable for Coast Artillery use.

Project No. 640, Comparative Test of Solid Head and Spring Leaf Types of Chamber Sponges.—Under Project No. 514 the Coast Artillery Board conducted a test of a combined sponge-rammer. As a result of this test, the Board recommended the issue of the spring-leaf type chamber sponge in lieu of the solid-head type. The Ordnance Department has requested a comparative test of solid-head and spring-leaf before final action is taken.

Project No. 641, Atmosphere Slide Rule.—A statement has been requested from the Coast Artillery Board as to the necessity for issue of Atmosphere Slide Rules for long-range batteries. This matter is under study in connection with standard fire-control equipment.

Project No. 642, Digit Finger Lamp for Lighting of Fire-Control Instruments.—For use in connection with the project for the illumination of sights and scales of mobile artillery for night firing, the Ordnance Department has furnished the Coast Artillery Board with three Digit Finger Lamps. These Lamps can be clamped on a finger or on any convenient part of the gun, carriage, or sight, and operate from the ordinary dry battery of a pocket flash light. They are being tested by the 51st Coast Artillery.

MAXIM LXX

The conduct of a general in a conquered country is full of difficulties. If severe, he irritates and increases the number of his enemies. If lenient, he gives birth to expectations which only render the abuses and vexations inseparable from war the more intolerable. A victorious general must know how to employ severity, justness, and mildness by turns, if he would allay sedition or prevent it.—Napoleon's Maxims of War.

BOOK REVIEWS

History of the Great War Based on Official Documents: Military Operations Egypt and Palestine, from the Outbreak of War with Germany to June, 1917. By Lieutenant General Sir George MacMunn, K. C. B., K. C. S. I., D. S. O., p. s. c., and Captain Cyril Falls. H. M. Stationery Office, London. 1928. 5½"x 8¾". 445 pp. Ill. 12s. 6d. Case of Maps, 5s. 6d.

Through the direction of the Historical Section of the Committee of Imperial Defence, Great Britain is making rapid progress in the preparation of the history of British participation in the World War. Where our own Historical Section has barely started on the American History, the British have already brought out numerous volumes covering the many phases of several theaters of action. Judging from the volumes already issued, it is to be doubted that much would have been gained by further delay.

The present volume is the first of two covering operations in Egypt, Palestine, and Syria. Few Americans appreciate the importance of this theater in the World War and its influence upon the Western Theater. To bring out these points, the authors start their work with the outbreak of war with Germany, rather than with Turkey, and devote the first part of the book to an explanation of the British administration in Egypt and of the delicate situation created in that country by the outbreak of war.

Throughout the book the authors have been particularly careful to present a clear picture of the various engagements from both sides, and the comparatively localized nature of operations simplified their task in this respect. In general, the book is easier to read and the action easier to follow than is the case with the account of operations on the Western Front where the great number of organizations involved, the extent of active front actually engaged, and the continual minor operations undertaken complicate the narrative.

In outline, the text covers the Turkish attack upon the Suez Canal in February, 1915, the effect of the Gallipoli campaign upon Egyptian affairs and the administrative reorganization resulting therefrom, the operations of the Senussi on the western frontier, and the advance across the Sinai peninsula. Space is devoted to an account of the growth of the Arabian revolt and the assistance received from the Arabs. The account is carried to the deadlock which followed the Second Battle of Gaza and closes with the recall of General Sir A. Murray in June, 1917.

In two respects, the American reader will find the text—excellent though it is—a trifle confusing. The spelling of place names follows the system adopted by the Permanent Committee on Geographical Names for British Official Use, of the Royal Geographical Society, and differs in numerous cases from the spelling employed on the usual maps. Also, abbreviations may be found difficult by those not familiar with the British military organizations, for it is necessary to make such translations as "4/K. O. S. B." to read "1st/4th Battalion of the King's Own Scottish Borderers" and "N. Z. M. R. Brigade" to the "New Zealand Mounted Rifles Brigade."

Included in the text are sketches which enable the general reader to follow the narrative satisfactorily. For the military student there is a case of excellent maps, sold separately. Several panoramic views show the terrain and some of the localities mentioned. The index is adequate.

The Turning Point of the Revolution or Burgoyne in America. By Hoffman Nickerson. Houghton Mifflin Company, Boston and New York. 6"x 8½" 55 pp. Ill. \$6.00.

From a military point of view, the eight years of the American Revolution produced but two events of real military importance—Saratoga and Yorktown. Of these, Yorktown has probably the greater sentimental appeal, but Saratoga was of far greater military value. Without Saratoga, the surrender at Yorktown could never have occurred, but after Saratoga and the consequent entry of the French into the conflict, Yorktown or another similar terminating episode was almost inevitable.

So deeply does the author feel that the surrender at Saratoga won the war that he has studied deeply the campaign itself, all the events leading up to or accompanying Burgoyne's expedition, and all the factors which may have affected the outcome. From this study comes a scholarly analytical account of the war in the north, passing lightly over only the military operations preceding formulation of the plan to cut the colonies along the line of the Hudson river valley. He paints his background with both depth and breadth, and he delineates his characters with boldness. He is meticulous in his attention to details; and his observations on the strategical and tactical situations are in general entirely sound.

In two respects only are we inclined to question Mr. Nickerson's estimates. When he says that "Sir Henry Clinton . . . was perhaps the best of the British commanders in America throughout the Revolution," he overlooks the claims of Clinton's second-in-command at a later period. Admitting that Cornwallis was a politician and played politics with his position, he was much the more vigorously inclined of the two and seems to have had a clearer conception of the military problem confronting the British. Clinton, the more cautious, would have advanced slowly in mass, establishing bases as he went and taking his time about his operations. Cornwallis, impatient of bases, would strike out boldly and had no great disinclination to engage with inferior numbers. He would carry the war to the enemy—which Clinton did not do—and his defeat at Yorktown was more the fault of Clinton than of Cornwallis. Clinton, however, had no delusions as to the amount of assistance to be obtained from the Tories, while Cornwallis very materially deceived himself on this point.

Again, the author finds considerable military merit in Horatio Gates, despite his unpleasing character. It does not seem possible that any man possessed of military understanding could have made the mistakes that Gates did upon joining the army in the South. Whatever may be the truth regarding Gates and Clinton, Mr. Nickerson does not hesitate to express his opinion of these two and of all the commanders involved in the Saratoga campaign. His exhaustive and accurate study will be of great value to the military student.

De l'emploi tactique de l'organisation du terrain et des destructions. By G. Baills, Lieutenant Colonel of Engineers. Berger-Levrault, Paris. 1928. 5¼"x 9". 174 pp. Paper. 12 francs.

Provisional instructions on the organization of the ground were issued in 1924 to the French Army as a supplement or annex to the instructions on the tactical employment of large units. These instructions, Lieutenant Colonel Baills fears, in so far as organization of the ground is concerned, have become a dead letter for most of the Army and his book is a plea for training in this particular part of combat instruction. Knowing how the pendulum swings from one extreme to another, he takes up field fortification historically in an attempt to keep the French Army from making the mistakes it made prior to 1870.

Largely by quotations, he shows how thoroughly Napoleon understood the use of ground organizations under all circumstances, but particularly in connection with offensive campaigns. Following Napoleon, the French army departed from the Napoleonic doctrine and fell into the disaster of 1870. Attempting to apply the lessons of that war, the French returned to the teachings of the great Corsican, but applied them incorrectly and suffered therefrom in 1914. The following years of the war unduly emphasized organization of the ground until 1918, when the Germans were driven from their organized positions. Now, Colonel Baills feels, the French are swinging to the other extreme and are prone to neglect field fortification. He places army officers—and particularly the seniors—in two classes. The first consists of those who experienced the terrible underground network of trenches, *abris*, command posts, and communications of the World War and feel that they have learned all about field fortification in the school of experience. The others are those who, in school or elsewhere, "have conceived, traced, staked out defensive organizations on the map and often, for this reason, have given orders generally impossible of execution under the conditions of time and place which they assumed" and who feel that a general idea of the subject is sufficient. To both classes he recommends study and practice in the tactical employment of organization of the terrain.

The preface is written by General R. Normand.

Dyke's Aircraft Engine Instructor. By A. L. Dyke. The Goodheart-Wilcox Company, Inc., Chicago. 1928. 6½"x 9½". 372 pp. Ill. \$5.00.

Back in 1902 or 1903 Mr. Dyke began to write books about automobiles and their engines. In 1910 he settled down to the *Automobile and Gasoline Engine Encyclopedia* which has run through fifteen editions or thereabouts. His *Anatomy of the Automobile*, published in 1904, devoted a section to "The Airship" and his *Encyclopedia*, from 1918 to 1922, carried an airplane supplement. The present book is therefore not in the least a new field for the author.

The style of the *Aircraft Engine Instructor* follows that of the well-known *Automobile Encyclopedia*, being divided into "Instructions" rather than into chapters, each instruction containing clear illustrations—both half-tones and line cuts—of the material under consideration. The book begins with a brief dis-

cussion of elementary automotive principles and then takes up in turn the Wright Whirlwind, the Wasp, the Curtiss, the Packard, the Fairchild-Caminez cam-type drive, and, more briefly, the Air-Cat, Bristol, Jupiter, Anzani, Junkers, Ryan-Siemens, and some of the older Aircraft engines. Aircraft engine lubrication is taken up as a separate subject; and then about seventy pages are devoted to magnetos, the Scintilla, Splitdorf, and Stromberg magnetos being discussed separately. Twenty pages cover aircraft engine starters and generators, and twenty more pages on aeronautic instruments and controls close that part of the book devoted to aircraft engines.

Of special value to the layman are the last two "instructions"—miscellaneous aircraft information and nomenclature for aeronautics. Among the subjects included are: air laws; licensing of aircraft, pilots, and mechanics; airports; air traffic rules; and requirements in the operation of aircraft. The index is comprehensive and reasonably complete.

The subject matter is highly technical but the simple style in which it is treated, combined with the numerous detailed illustrations and the colored diagrams, makes the text easily understood by the average nontechnical reader. This book will meet the demands of the layman as well as or better than any other book now available covering the subject.

Germany Ten Years After. By George H. Danton. Houghton Mifflin Company, Boston and New York. 1928. 5½" x 8¼". 295 pp. \$3.50.

The author, who is a member of the faculty of Tsing Hua University, in Peking, spent the academic year of 1925-1926 in Germany as Visiting Professor at the University of Leipzig and at the University of Berlin. These, and other, contacts enabled him to make a rather close examination into conditions in Germany and to secure the information given in the present volume, in which he analyzes the political, economic, and educational situation of Germany in the light of pre-war standards and post-war developments. As he himself says, "There are many significant movements which are entirely omitted, especially in art, literature, and philosophy. No statistics are presented. The book is based on sympathetic observation rather than on detailed investigation. It tries to show the German point of view in a friendly but objective way."

Throughout the book there is a double comparison: first, of present day Germany with the Germany of before the war, which the author knew in his student days; and second, of the Germany of today with other nations, particularly with the United States, in which case the comparisons are neither exact nor up-to-date. As might be expected from the nature of the contacts, academic Germany dominates the book. The Germans of the more poorly educated classes receive comparatively little attention, which, in view of their numbers, is unfortunate.

One learns, from what Professor Danton has to say, that Germany has changed more than have the Germans. No nation could survive the political and economic upheaval that fell to the lot of Germany at the end of the war and during the first few years thereafter without undergoing material change politically, economically, and socially. Such a change necessarily, reacts upon the natives

of the country, but it would seem that, at heart, the Germans have not greatly altered. They are more subdued than the Germans of the last generation, have for the moment developed a trace of an inferiority complex, are less self-centered, and display a tendency toward the modernistic movements so apparent in America. The most serious fault that Professor Danton finds is in a lack of objectivity—but that is not a new characteristic. In summary, he finds the German sensitive to criticism, unable to argue or debate impersonally, highly interested in what other nations are doing, becoming somewhat interested in athletics as a substitute for the compulsory drills of other days, highly specialized in education, and reverting to their thrifty ways following the spending orgy of the period of inflation.

MAXIM LXXIV

The leading qualifications which should distinguish an officer selected for the head of the staff are, to know the country thoroughly; to be able to conduct a reconnoissance with skill; to superintend the transmission of orders promptly; to lay down the most complicated movements intelligibly, but in a few words, and with simplicity.—Napoleon's Maxims of War.